# AVIATION WEEK

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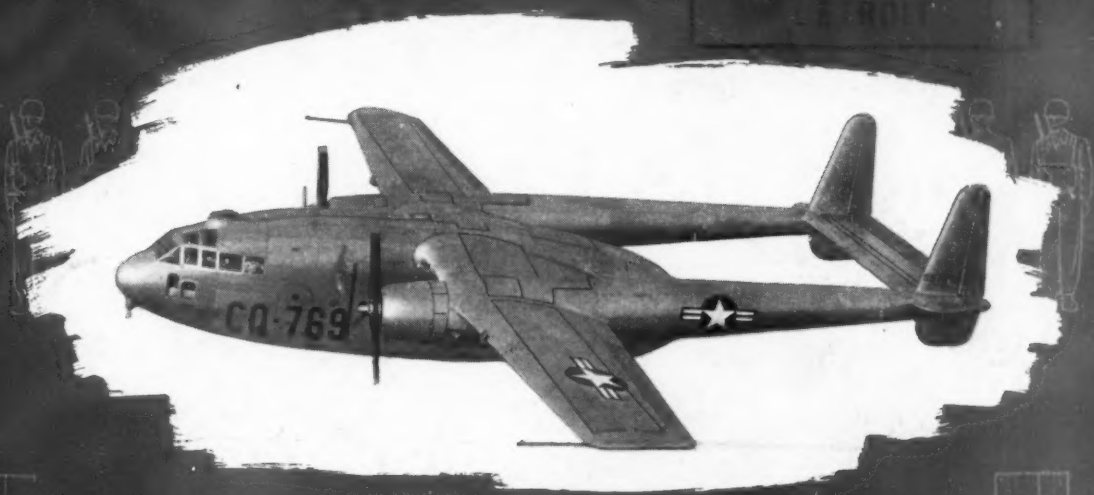



## HEAVIER LOADS FOR THE PACKET
## WITH WASP MAJORS

Fairchild's new C-119 Packet, improved version of the already famous C-82, carries up to ten tons of payload in its huge fuselage. This versatile cargo carrier can accommodate a wide variety of heavy loads ranging from paratroopers or litter patients to jeeps, artillery pieces or even light tanks.

Two dependable Pratt & Whitney Wasp Major engines, each delivering 3,250 horsepower, give this new Packet considerably increased payload, speed and climb.

**PRATT & WHITNEY AIRCRAFT**

EAST HARTFORD, CONNECTICUT

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

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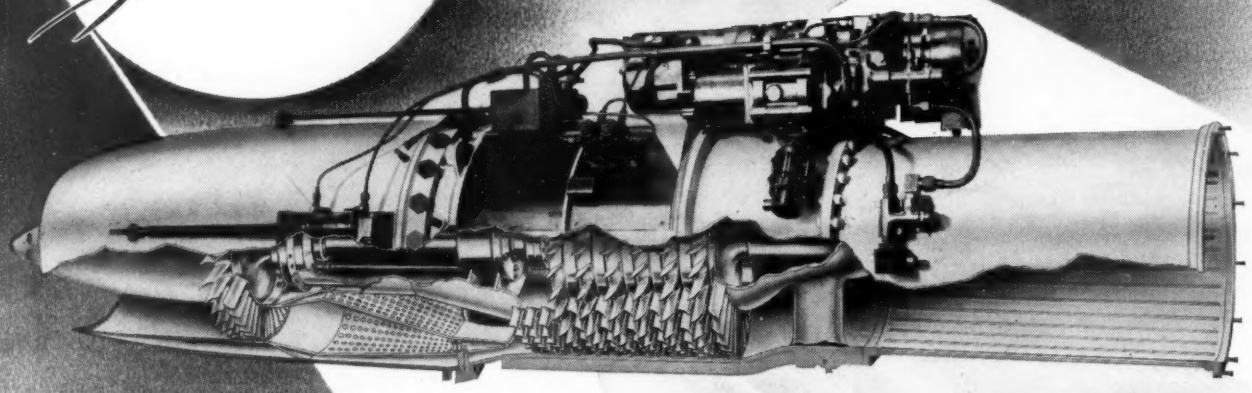
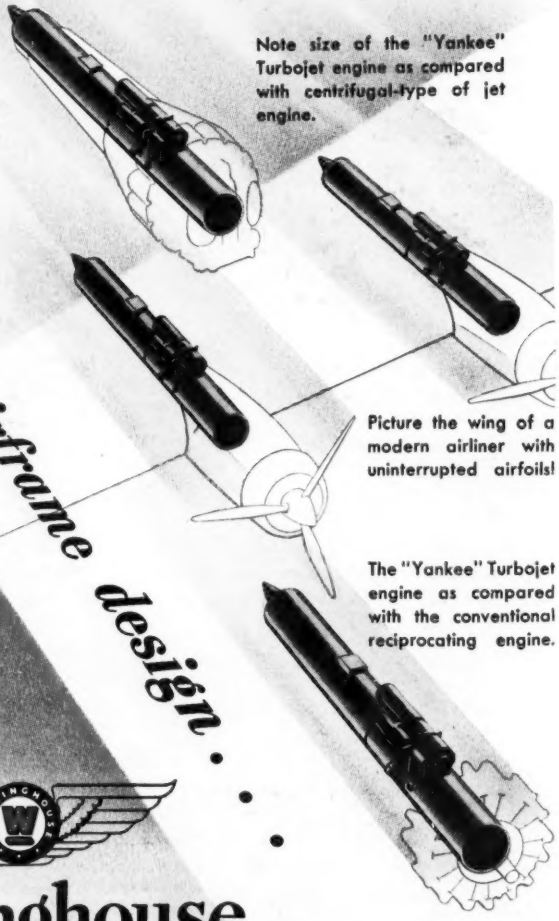
# AXIAL-FLOW *Yankee*



. . . for unrestricted airframe design . . .



Note size of the "Yankee" Turbojet engine as compared with centrifugal-type of jet engine.

Picture the wing of a modern airliner with uninterrupted airfoils!

The "Yankee" Turbojet engine as compared with the conventional reciprocating engine.

Aircraft may now be planned to approach the ultimate in airfoil efficiency. This is made possible by the "Yankee" Line of Turbojet Engines . . . *first with axial-flow design in America.*

Designers no longer need be concerned with excessive engine weights where great power is required. The basic design of the axial-flow Turbojet, in which the compressor, combustion chamber and turbine are arranged in line, results in engines with exceedingly small diameters . . . lighter in weight per pound of thrust.

This dynamic new motive power represents five years of research free from the influence of other developments. Westinghouse Turbojet engineers are ready to supply data and suggestions for Jet Propulsion applications. Call your nearest Westinghouse office or write Westinghouse Electric Corporation, Lester Br. P. O., Philadelphia 13, Pennsylvania.

Send for the full-color booklet B-3834, "Westinghouse Jet Propulsion". J-50477

**Westinghouse**

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

*The "Yankee" Line of Turbojet Engines*

# The Birdmen's Perch

By *Major Al Williams,* ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

**Thank you, gentlemen,** thank you!

We mean for all the mail.

Some of your letters were delightful . . . some were informative . . . some were downright hilarious . . . and all were mighty interesting.

Apparently, the majority of you want to continue the Little Known Facts About Well Known Planes Dept. That's jake with us. In fact it's dandy!

So all you Perch Pilots (bottom rung), you would-be Perch Pilots, and sundry innocent bystanders can start to shoot in your Little Known Facts again.

Rules are the same as in the past:

If we use your "Fact," you get a commission (which couldn't look more impressive with neon lights!) as Perch Pilot (br). If we use 5 of your "Facts," you get promoted to Senior Perch Pilot.

And if any super-hero ever gets 20 of his "Facts" into our print, we're going to make him a Command Perch Pilot!

Wow!

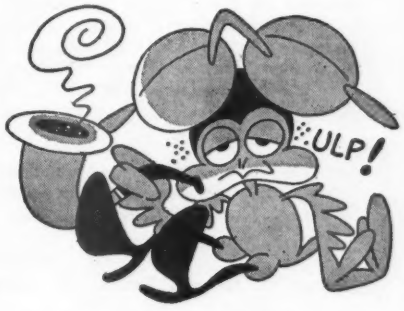
## PIPE THIS . . .

Smoke a pipe?

We do.

And we just finished one and tapped out the ashes.

Then we noticed that the cake around the bowl was pretty thick . . . needed to be reamed out . . . which we did. And while we were doing it, guess what we thought of . . .



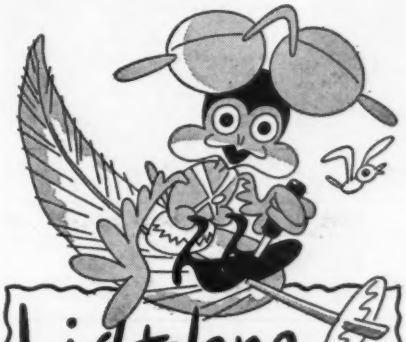

Yep, the Alchlor Process!

We were thinking how ordinary refining techniques clean a crude oil about the same way that tapping out the ashes cleaned our pipe. The ashes—and some of the impurities in the crudes—come out with relative ease.

But there are other impurities in oil, hydrocarbons which make sludge and carbon, that standard refining techniques fail to budge . . . just as tapping failed to budge the cake in our pipe bowl.

And that's where the famous Alchlor Process comes in . . . an *extra* refining step, it gets *extra* of the troublemakers out of Gulfpride!

Try it, and see!

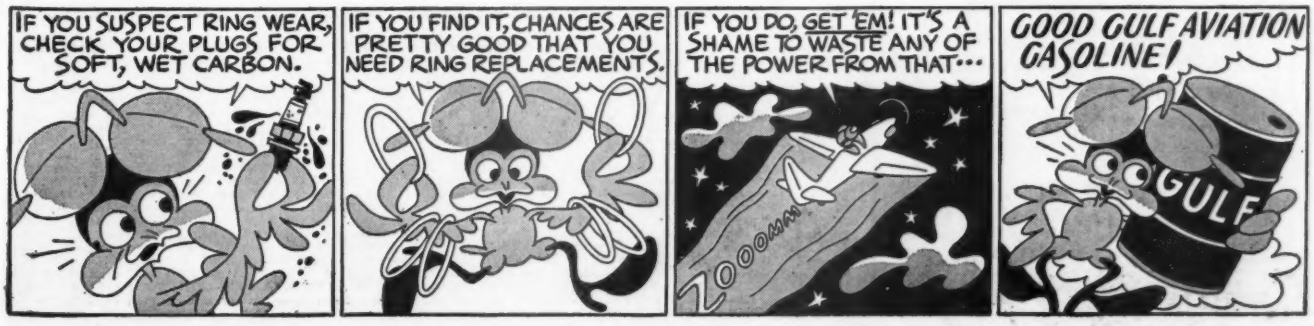


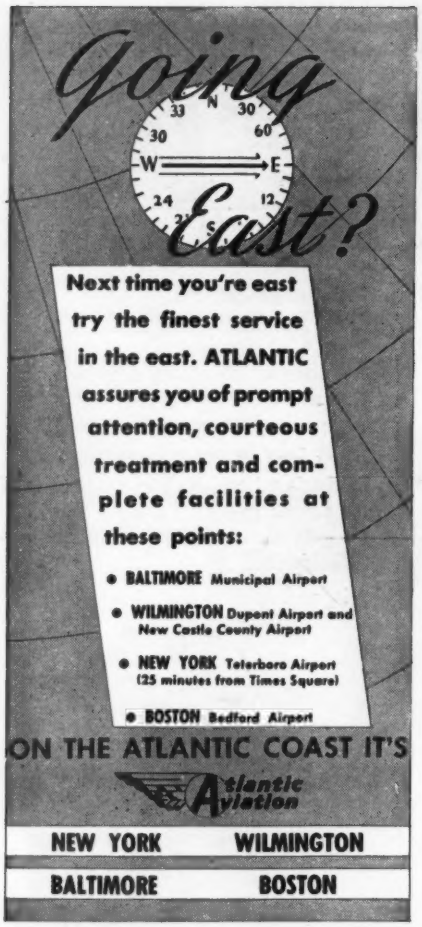
## Lightplane Owners:

**Watch this page next month for one of the most significant announcements ever made to lightplane owners or operators!**

**Gulf Oil Corporation and Gulf Refining Company . . . makers of**

**GULF AVIATION PRODUCTS**


IF YOU SUSPECT RING WEAR, CHECK YOUR PLUGS FOR SOFT, WET CARBON.
IF YOU FIND IT, CHANCES ARE PRETTY GOOD THAT YOU NEED RING REPLACEMENTS.
IF YOU DO, GET 'EM! IT'S A SHAME TO WASTE ANY OF THE POWER FROM THAT . . .
GOOD GULF AVIATION GASOLINE!
GULF


Going East?
Next time you're east try the finest service in the east. ATLANTIC assures you of prompt attention, courteous treatment and complete facilities at these points:
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• WILMINGTON Dupont Airport and New Castle County Airport
• NEW YORK Teterboro Airport (25 minutes from Times Square)
• BOSTON Bedford Airport
ON THE ATLANTIC COAST IT'S
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NEW YORK
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Vol. 48 No. 21

# AVIATION WEEK

May 24, 1948

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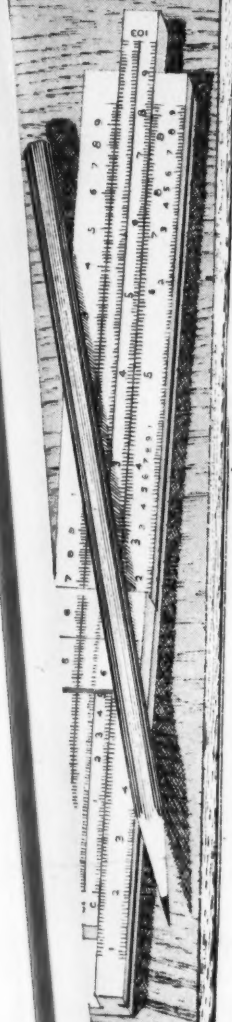
# Aircraft ball bearing development in step with aviation progress



## SPECIFICATION

**Ball Bearings for High Speed Turbines**

**MUST** handle high speeds . . . 35,000 to 105,000 r.p.m.

**MUST** compensate for extreme temperature variations . . . —30° to +300° . . . within a few inches.

**MUST** provide lubrication within small space and to withstand temperature extremes.

**MUST** hold weight and space to absolute minimum.

## SPECIALIZATION

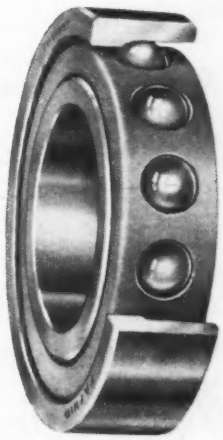
**Fafnir extra light, compact Super-Precision Ball Bearings**

★ Made to super-precision tolerances to maintain accurate shaft positioning at high speeds.

★ Ultra-compact, large bore type, lighter in cross-section and with smaller outside diameter in proportion to bore dimension than usual ball bearing. Ample supporting surface for both housing and shaft.

★ Maximum ball complement construction for greatest radial capacity and with thrust ability in one direction.

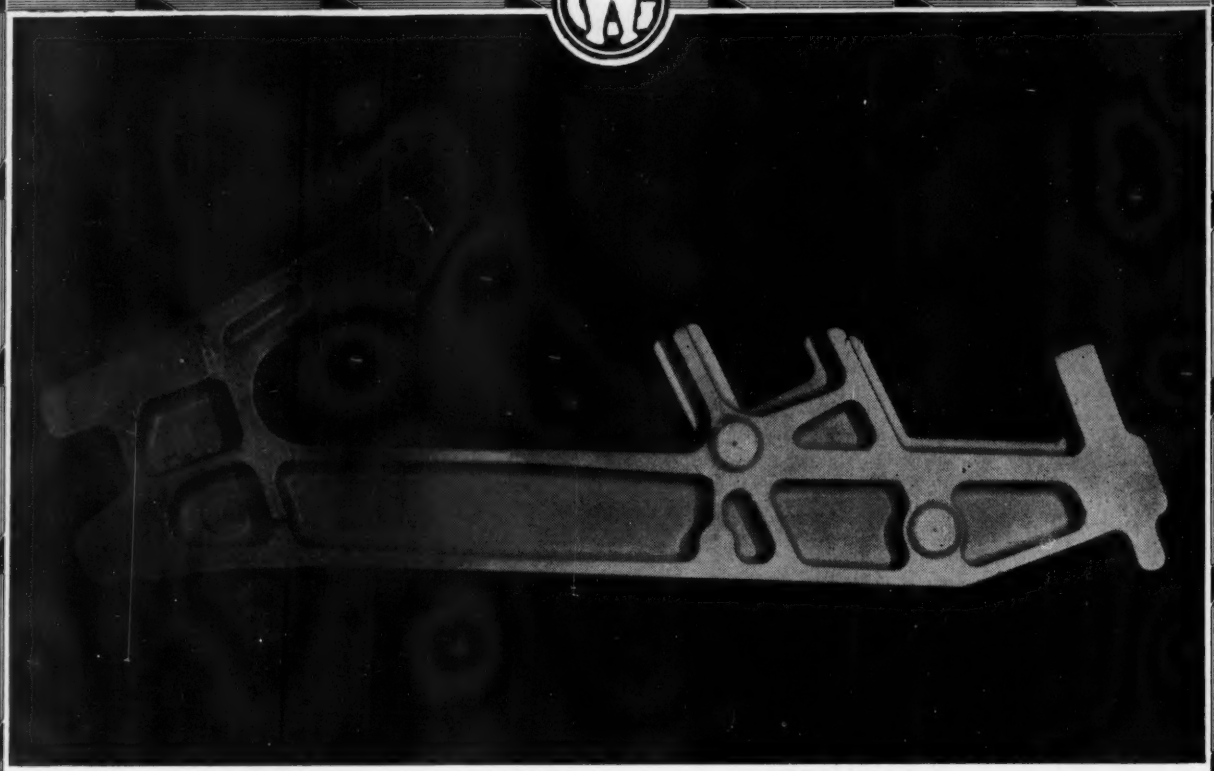
★ Solid composition retainers machined all over.



For twenty years the Fafnir Aircraft Division has grown with the aircraft industry by working constantly with research men, designers and engineers. That's how these Fafnir specialists got the industry habit of regarding a job done as just the beginning of a job to do . . . using each new achievement as the take-off for another advance.

That is also why Fafnir has been responsible for the major developments in ball bearings for aircraft. And why Fafnir is the logical first choice for either aircraft ball bearings or for air-minded collaboration in solving new bearing problems. The Fafnir Bearing Company, New Britain, Conn.

THE **FAFNIR** **Aircraft** Ball Bearing **Division**



THE forging shown above, over six feet in length, is used in the fuselage structure of one of the fastest aeroplanes in the world. It is forged from 75-S aluminum alloy and is one of the largest die forgings ever attempted in this difficult material. The availability of such forgings opens new opportunities for aircraft builders to simplify and improve many structures which heretofore of necessity have been built-up assemblies—all of which will promote increased quality and performance, together with decreased costs, and thus further enhance the superiority of American aircraft design.

*Standard of the Industry for More Than Sixty Years*

**WYMAN-GORDON**

***Forgings of Aluminum, Magnesium, Steel***

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS - - - DETROIT, MICHIGAN

### Light Planes for Business

Employment of the small airplane, variously labeled as the light, personal, or private plane, for strictly utilitarian purposes by business firms and farmers continues to be the brightest civilian spot in the future of the airplane dealer and manufacturer. Eventually, they may put the business back on its feet, if the dealers and manufacturers can hold out.

Advance indications so far this year don't promise too much for 1948.

**But at the same time 1948 is likely to be remembered as the first year when virtually all the major lightplane manufacturers fixed their sights primarily on the business flyer and farm flyer targets.**

Most of the manufacturers already are marketing four-place planes, admittedly designed as counterparts to business automobiles and farm station wagons. Only one manufacturer now in production (Texas Engineering & Manufacturing Co.) has indicated it will stick with the two-place market exclusively. And that maker is producing an all-metal retractable landing gear two-place plane of relatively high performance and good range—which has a place in the business plane market anyway.

### Only 550 Planes a Month

So far, in the first four months of 1948, shipments of principal lightplane makers have averaged approximately 550 planes a month, although this period includes much of the year's worst flying weather. If that average should continue, the total year's shipments would be below 7000, well under half the 1947 lightplane shipments.

**The next five months will be the major plane selling season of the year, if seasonal trends in earlier postwar years are repeated. But a monthly average of 970 planes for the remaining eight months would be called for if the year's total is to reach 10,000—two-thirds of last year's total.**

April, best month so far this year, showed a total of 737 civilian planes. Four-placers shipped so far this year totaled 937, or nearly half the entire shipment, while the April four-placer shipments amounted to 280.

### Spring Training

Greater emphasis on the smaller planes in April probably is due to flight training operators replenishing their fleets of trainers for the big flying season. How the two-placer market continues will depend largely on what happens to GI flight training in Congress.

Several bills, pro and con, have been in committee for some weeks, but as this is written there is no indication of what—if anything—is coming out. If Congress does not change GI flight training, the trainer market should continue fairly strong for the next two months at least.

### Cost Declines as Utilization Rises

Compared to surface vehicles, four-place airplanes are relatively expensive, the lowest cost four-placer being pricetagged at $3825, with others ranging up to $13,750. But if the plane can be used enough hours in a year, with 200 hr. being about the break-even point, then it vies with any other type of transportation in costs per mile. Up until now, most users of private planes haven't flown them enough to get this advantage.

**But business firms and farmers are beginning to find out that the planes are economical commercial transportation media, and open up new trade areas heretofore unaccessible because of distance when surface transportation was used.**

Some principal lightplane makers report the following 1947 estimates of use of their planes not for pleasure: Stinson, 87 percent; Cessna (mostly two-placers last year) 40 percent; Piper, over 50 percent; Luscombe, 35 percent to farmers, 20 percent to businessmen. Bellanca estimates that in 1948 nearly 50 percent of its sales will be for business man use.

Ryan Aeronautical Co., last week lifted its four-place Navion price $240 to $8990 flyaway San Diego, as a result of material and accessory price increases and added equipment. Beech Aircraft Corp. prices its four-place Bonanza, closest competitor for the Navion, at $9445. Stinson asks $6444 for the Voyager. Other four-placer prices: Cessna 170, $5475; Cessna 190, $12,750; Cessna 195, $13,750; Aeronca Model 15 sedan, $4795; Piper PA-14 Family Cruiser, $3825. Luscombe's Silvaire Sedan, just on the market, is pricetagged at $6995.

### Price Trends and Utilization

Such a wide spread in four-placer prices offers a good proving ground for two conflicting theories of pricing: 1. Price your commodity low enough and the consumers will build your mass market; 2. Make your commodity attractive enough and enough consumers will want it to make mass production economies possible with consequent reductions in price.

But the final test still remains: Utilization. When it can be demonstrated to enough prospective aircraft owners that they can get real economical utility transportation from small airplanes, and that they need that much transportation; then, and not before, will the market for small planes be on its way to a mass market dimension.

# 3 Popular Names...

## PROVED, RELIABLE PRODUCTS

**"Unbrako"** Alloy-Steel Socket Screw Products, famed for their strength, are precision-made . . . and the Internal Wrenching feature facilitates compact designs, thus saving material, space and weight. That's why these "Unbrako" Products are being specified more and more by aircraft engineers and designers.

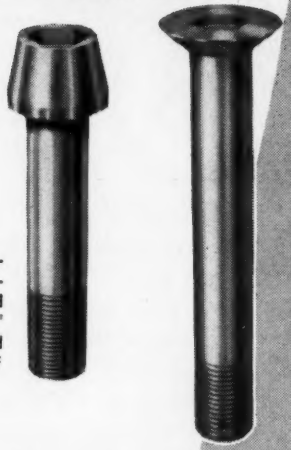
**"Hallowell"** Ready-Made, most serviceable Shop Equipment of Steel gives years and years of excellent service, which explains its ever-growing popularity. The line comprises: Work-Benches, Tool Stands, Foreman's Desks, Chairs, Stools and Trucks—in a wide variety of styles and sizes—all built of sturdy, hard-wearing steel.

**"Flexloc"** Self-Locking Nuts are of the one-piece, all-metal construction, available in N.F. and N.C. thread series. The torque is unusually uniform, because it is *controlled*. The "Flexloc" can be used over and over again without losing much of its locking ability. Sizes from #6 to 2" in diameter. Ask for your samples and literature.

**Write us for the name and address of your nearest "Unbrako," "Hallowell" and "Flexloc" Industrial Distributor.**

## UNBRAKO SOCKET SCREW PRODUCTS

Reg. U. S. Pat. Off.



The "UNBRAKO" Internal Wrenching Lock Nut (A), Internal Wrenching Bolt (B), and 100° Flush Head Socket Bolt (B) . . . meet the "nth" degree of precision, tensile and other stringent requirements of the Aviation Industry.

## HALLOWELL SHOP EQUIPMENT OF STEEL

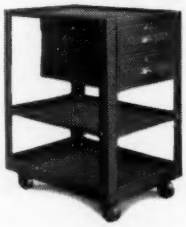


FIG. 1855

"HALLOWELL" Movable Tool Stand of Steel . . . heavy duty . . . may be had with rubber-tired casters.

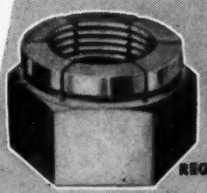
FIG. 732
PAT. & PATS. PEND.
DRAWER EXTRA

"HALLOWELL" Work-Bench of Steel—several hundred combinations—a number of standard heights, widths and lengths.

## FLEXLOC ONE PIECE SELF-LOCKING NUTS

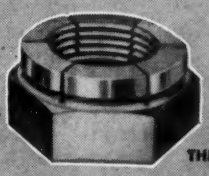
*"The nut that will not shake loose"*

"FLEXLOC" One-Piece, Self-Locking Nuts . . . convince yourself with a few *free samples!*



REGULAR

PAT'D & PATS. PEND



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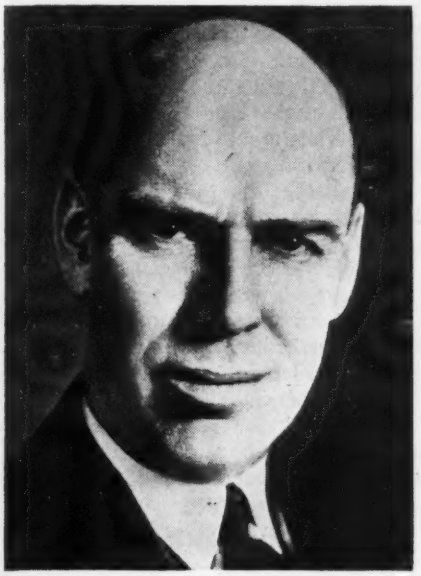


Sen. Brewster (left) and Rep. Hinshaw—world's biggest airline should watch over planes.

# Plane Development Fight Starts

**Brewster-Hinshaw bill to authorize federal transport program stirs military vs. civilian control issue.**

Legislation authorizing a government developmental program for transport aircraft and equipment has touched off a fight over civilian versus military control.

Companion bills introduced last week by Sen. Owen Brewster (R., Me.) and Rep. Carl Hinshaw (R., Calif.), former chairman and vice chairman, respectively, of the Congressional Aviation Policy Board, direct the Secretary for Air to undertake a comprehensive program for development of plane types "designed primarily for commercial transport and cargo service, but adaptable also as auxiliary military transports."

A five-member Civil Air Transport Evaluation Board, composed of representatives of the Air Force, Navy, NACA, CAA and CAB, would act in an advisory capacity to the Secretary for Air. A six-member industry advisory committee, appointed by the secretary, would function under the Board.

► **Commerce Opposition**—Commerce Department officials immediately announced opposition to lodging control over the program with the Secretary for Air. Arguing that transport craft are primarily for civilian use and should, therefore, be developed by a civilian organization rather than by the military (which is likely to place primary emphasis on military utilization), Commerce spokesmen indicated the Department is set to fight the Brewster-Hinshaw legislation.

Hinshaw stood pat behind his bill, declaring "the Air Force, which runs the biggest airline in the world, is certainly best qualified to manage development of aircraft primarily for commercial transport use." Air Transport Association's executive vice president, Robert Ramspeck, supported Hinshaw's position.

The Brewster-Hinshaw bill would:

• Authorize the Air Force to sustain the cost for "design, development, testing, tooling, construction, and modification" of prototype transport and cargo aircraft, including engines, propellers, instruments, accessories, and other standard equipment. The Secretary for Air would be barred, however, from using Air Force appropriations for development of "commercial equipment," such as removable furnishings not part of the primary structure or mechanical apparatus of the plane.

• Direct the Secretary for Air to survey national requirements for transport and cargo aircraft and to prepare and approve the operating and utility characteristics and specifications for such aircraft.

• Authorize the Secretary to enter contracts for prototypes of approved designs with manufacturers who agree to three stipulations: (1) that a reasonable profit be allowed on prototype contracts "not exceeding such profit as may be prescribed by the secretary"; (2) that the manufacturer sell craft patterned from the prototype at a "fair domestic selling price" which does not reflect the developmental costs borne by the Air Force; and (3) that the manufacturer fill no commercial orders making changes in the prototype design without the approval of the Secretary.

• Direct the Secretary to make a study of "means and methods" by which the government might recoup its expenditures under the transport development program and submit it, along with recommendations, to Congress "at the earliest practicable date."

## Truman Acts to Appoint Board for National Strike

First major step in several months toward settlement of the National Airlines pilot strike came last week when the White House announced plans to appoint an emergency fact-finding board.

President Truman's action was provoked by indications that the strike might spread and disrupt interstate commerce to a substantial degree. AVIATION WEEK disclosed April 5 that the Air Lines Pilots Association and the International Association of Machinists were conferring on future strategy which might force intervention of a Presidential emergency board. It was pointed out that if ALPA and IAM personnel of other carriers serving Miami, Newark, and New Orleans refused to cross NAL picket lines the entire domestic air transportation systems could be seriously affected.

Recommendations of a Presidential emergency board are not binding on either party. ALPA in September, 1946, rejected wage rates and working rules urged by a similar board and struck TWA shortly thereafter. TWA had accepted the recommendations.

Sens. Hatch (left) and Pepper led fight to give other side of charges against aircraft maker.

# Minority Report Backs Hughes

## Four members of Senate Investigating Committee lash majority and argue nothing was wrong in contracts.

A minority report completely exonerating Howard Hughes of any failure in performance on his $40,000,000 wartime flying boat and XF-11 reconnaissance plane contracts—as well as any fraud, corruption, wrongdoing, or use of political influence—was issued last week by the Democratic members of the now-defunct Senate War Investigating Committee.

Senators signing the report dissenting from the majority report of the Republican membership: Sen. Carl Hatch (D., N. Mex.); Sen. Claude Pepper (D., Fla.); Sen. J. Howard McGrath (D., R. I.); and Sen. Herbert R. O'Connor (D., Md.).

▶**Majority Listed**—Majority report was approved by Sen. Owen Brewster (R., Me.), who served as chairman of the war investigating group; Sen. Homer Ferguson (R., Mich.); Sen. Joseph McCarthy (R., Wis.); Sen. John Williams (R., Del.); Sen. George Malone (R., Nev.); and Sen. Harry Cain (R., Wash).

"Through its investigation and hearings the committee raised in the minds of critical and suspicious people the fact that Hughes and his companies might have been guilty of serious, deliberate, wrongful conduct, perhaps fraud and corruption," the minority declared. "Howard Hughes and his companies were entitled to a positive finding by the committee, especially so far as fraud, corruption, and willful wrongdoing are concerned. There is absolutely nothing in the evidence which discloses any fraud, corruption, or wrongdoing on the part of Howard Hughes or his associates. All the evidence is directly to the contrary. Nowhere is there any evidence that any excessive profits were realized by Hughes from either the flying boat or the photo-reconnaissance plane projects. Exactly to the contrary, the evidence discloses . . . that Hughes has spent some seven millions of dollars of his own money, for which he will not be reimbursed. . . . There was no political pressure . . . in the letting of the contracts." (The majority report indicated pressure from the late President Roosevelt and Col. Elliott Roosevelt in the awarding of the reconnaissance plane contracts).

▶**Praise Photo Plane**—Hughes' photo-reconnaissance plane, the minority asserted, "has reportedly lived up to all of the specifications and performance guarantees of the manufacturer and may still prove to be the best photo-reconnaissance plane the Air Force has. . . . It is too early now to judge what scientific research benefits may be derived eventually from" the flying boat project.

The Air Force has accepted and is in the process of paying for all three XF-11 planes including the first flight model which crashed while Hughes piloted it on a test hop. An Air Force accident report attempted to place major blame for the mishap on "pilot error" but did not press this charge to avoid payment for the wrecked plane.

The Hughes-Brewster sideline fight which colored the Senate committee's investigation of the Hughes contract flared again but was quickly suppressed. Hughes has charged that Brewster used the threat of investigation to attempt to coerce him into merging TWA with Pan American Airways and supporting the Brewster-sponsored Chosen Instrument Bill. Brewster countered that Hughes approached him in an attempt to have the investigation called off.

First report issued by the minority stated that the majority "should not have completely ignored in its report the facts brought out regarding the charges and counter-charges exchanged by Hughes and Sen. Brewster." The report was withdrawn, and a second report issued by the minority omitted mention of the Hughes-Brewster issue.

Following are the main findings of the minority:

(1) Further investigation of Wright Field procurement practices—as proposed by the majority—is warranted. It should be directed at: hamstringing of procurement through personal prejudices of military personnel; failure to follow out orders of superiors; vacillation and indecision; failure to fix proper priorities for materials and manpower; red tape; unreasonable "pride of authorship" in design of aircraft and resulting reluctance to accept "outside" ideas regardless of merit.

(2) There was no justifiable reason for investigating the Hughes contracts. "Of the many billions of dollars spent by the government for airplanes in the war, the Hughes and Hughes-Kaiser contracts amounted to approximately $40,000,000, or only a fraction of one percent. While it is true that no airplanes were delivered by Hughes in time for combat service, it is also true from evidence submitted that the government bought and paid for 61 other types of planes at a cost of hundreds of millions of dollars which likewise never saw combat service. None of these contracts has been made the subject of an investigation."

(3) The majority report committed a misleading blunder in sketchily covering Maj. Gen. Bennett Meyers' activities in connection with Aviation Electric Co., turned over for court action, in its Hughes report. Although the majority "does clearly state that those activities were unrelated to the Hughes' companies . . . a casual reading . . . by persons not too discerning could easily lead to a conclusion that there was some connection . . . It would have been the better and fairer practice not to have discussed these matters (of Meyers and Aviation Electric) at all" in the Hughes' report.

(4) The majority should not "have implied difficulty in determining whether Gen. Meyers or Howard Hughes was telling the truth in his testimony." (Hughes testified that Meyers attempted a $200,000 "shakedown" to finance a $10,000,000 war bond purchase and sought promise of a post-war job during the time Hughes' reconnaissance plane contract was up for

approval at Wright Field where Meyers was second in command. Meyers claimed Hughes offered the $200,000 and the postwar job. The majority report commented that "in view of the conflicting testimony and in the absence of other evidence it is not possible . . . to determine what offers and requests were made by Hughes or Meyers. The fact that neither . . . made any report to appropriate authorities of these negotiations of an obviously corrupt nature raises serious questions as to the ethical standards each now professes to possess"). "Gen. Meyers stands today a convicted suborner of perjury and the evidence compels the conclusion that Hughes' testimony was true. If there were any 'obviously corrupt' negotiations, they were entirely on the part of Gen. Meyers."

(5) Legislation requiring persons dealing with the government and government officials to report promptly all attempts at bribery, extortion, or any other corrupt actions in connection with negotiations should be considered—as recommended by the majority.

(6) The majority report signed by Sen. Brewster and Sen. Ferguson, is critical of the letting of the Hughes contracts. But, in 1943, the same two senators signed a report declaring: "experiments have been carried on by the Kaiser-Hughes Corporation to build a large wooden seaplane for cargo purposes . . . credit should be given Mr. Donald Nelson, chairman of the War Production Board, for his active interest in the cargo type of seaplane over the opposition of the Navy. . . . It is important to continue experimentation with the seaplane . . . as a cargo carrier."

## Arthur Riley Elected New Aviation Writers President

Arthur A. Riley, aviation editor, Boston Globe, was elected president of Aviation Writers Association at the 10th annual convention in New York, succeeding Gene Dawson, aviation editor, Indianapolis News. Leslie V. Spencer, vice-president, Bermingham, Castleman & Pearce, Inc., New York, was re-elected treasurer.

Ralph McClarren, Franklin Institute, Philadelphia, was elected executive secretary, succeeding Gerard B. Dobben American Aviation, Washington. Vice presidents named were: George Scheurer, South Bend (Ind.) Tribune; Dick Kirschbaum, Newark (N. J.) News, and Roger L. Williams, San Francisco News. Retiring vice presidents were Gaither Littrell, former Los Angeles editor of Flying; Robert H. Wood, editor of AVIATION WEEK, and Tom Ashley, managing editor of Southern Flight, Dallas. Kendall K. Hoyt, Aero Digest, Washington, was elected chairman of the Board of Governors, succeeding Robert Sibley, Boston Traveler.

Air Secretary W. Stuart Symington was principal speaker in a program which included visits to New York International Airport (Idlewild) and Floyd Bennett Field to witness Navy, CAA and Air Force flight demonstrations. Other flight demonstrations scheduled on the Coral Sea were canceled because of weather. Following the convention, approximately 150 of the group made a one-day flight to Montreal and returned to New York in a demonstration of Canadair's new DC-4M transport planes. Convention registration was largest in Association history: 269.

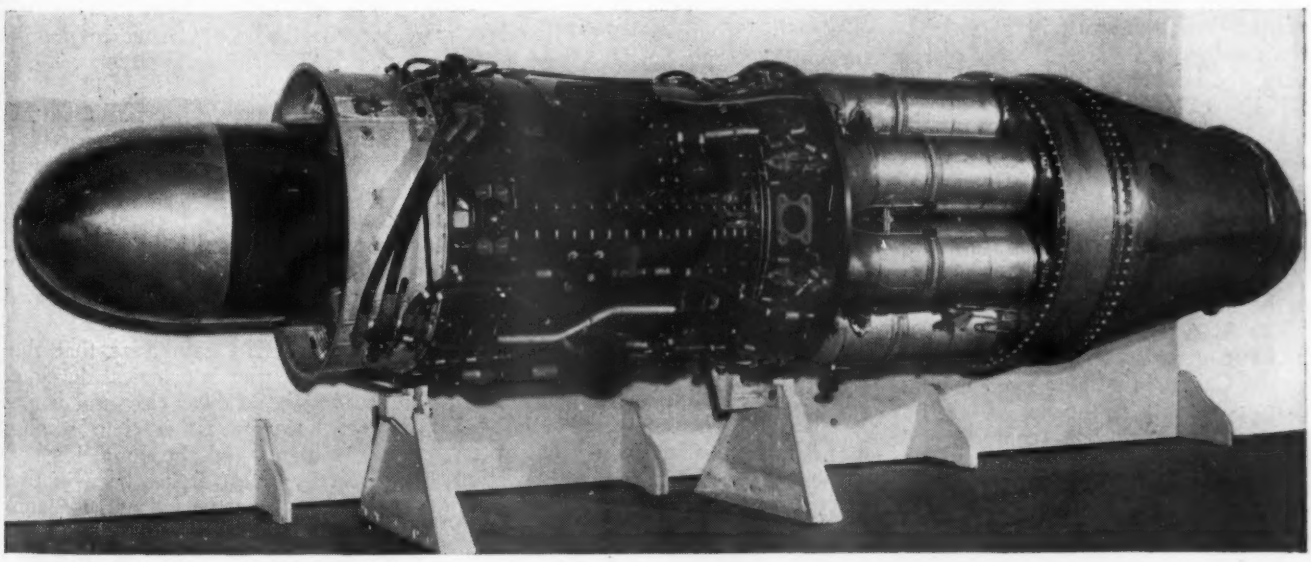
## TWA Seeks $10,000,000 RFC Loan to Meet Crisis

TWA has asked the Reconstruction Finance Corp. for a $10,000,000 loan to weather a financial crisis caused by a lack of funds with which to meet current obligations.

Board Chairman Warren Lee Pierson wrote RFC last week that TWA does not have cash to meet a $1,100,000 payment due May 28 on a $40,000,000 debt to the Equitable Life Assurance Society of the United States. The carrier also lacks funds to meet other debts which are scheduled to mature in the near future.

Unless TWA is able to obtain sufficient money by May 28, it will be in default not only on the $1,100,000 payment but on the entire $40,000,000 Equitable loan plus $8,000,000 in other loans which will then become immediately due and payable. Pierson noted that his company lost $14,500,000 on foreign and domestic operations in 1946, $8,000,000 in 1947, and has continued in the red this year.

The Civil Aeronautics Board (which must sanction the RFC loan) has not granted sufficient mail pay relief to permit meeting immediate financial obligations, TWA declared. It added that heavy losses in recent years have left the company with no means of obtaining financial aid from banks or other private sources.



**Greater Thrust, Better Performance From GE's New TG-190 Jet Engine**

**Closeup of new TG-190 discloses external features identical to the TG-180, permitting engine interchangeability in current aircraft. New engine produces 5000 lb. static thrust and is slated for installation in all Air Force jet aircraft with exception of Lockheed P-80C. Increased power is obtained through higher pressure ratio, which permits near-ideal combustion, correcting deficiency in TG-180 which produced objectionable smoke trail. TG-190 has been in quantity production since fall.**

Orrin Farris, chief of CAA's ground lighting design unit, and AGA's lights.

## AGA Gets CAA Contract For High Intensity Lights

First high intensity approach lights for civil use will be installed at Washington National and Los Angeles Municipal airports. A $200,000 contract for the lights was awarded last week to American Gas Accumulator Co. of Elizabeth N. J. by Civil Aeronautics Administration.

Delivery of the lights is expected in September with installations scheduled to be completed before next winter's bad weather season begins. The high intensity approach lights are part of the bad weather landing aid system which includes either ILS or GCA. Funds for 19 additional high intensity approach light installations are contained in the fiscal 1949 CAA appropriation.

The AGA lights have been tested at the Landing Aids Experimental Station, Arcata, Calif. The lights stretch 3000 ft. from the end of the runway at 100 ft. intervals. Each light contains a 5 kilowatt incandescent lamp. Its intensity can be controlled from the airport control tower to meet various weather conditions.

### Airport Lighting Report

A report to the industry on airport lighting—both runway and approach—what systems are offered, who makes them, the history, and what the future is likely to hold will be published in AVIATION WEEK's next issue, May 31.

## Route to Rio

Servicos Aereos Cruzeiro do Sul, Rio de Janeiro, has asked CAB for a foreign air carrier permit to operate between Rio and New York.

# Super Carrier

**Navy gets go-ahead to build 65,000-ton craft capable of handling 75,000-lb. bombers.**

**By ROBERT B. HOTZ**

Navy cleared another hurdle last week in its flight to develop a giant aircraft carrier capable of handling planes twice the size of current ship-based bombers.

Heavy Munitions Subcommittee of the House Armed Services Committee approved a Navy request to divert some $300,000,000 already approved for construction of guided missile firing ships into a new program to build a prototype 65,000-ton flush-deck carrier and some new type anti-submarine vessels. Minimum cost for construction of the carrier is estimated at an amount totalling $124,000,000.

▶ **Switch in Funds**—Sudden switch of funds already approved by Congress to the giant carrier is indicative of current Navy strategy on Capitol Hill. This strategy is aimed at building Naval Aviation to the Navy's estimate of parity with the 70-Group U. S. Air Force without a direct Congressional test on this issue. Navy previously announced its intention of building up to a 14,500 plane strength by July 1, 1949 by exhausting its storage pools of reserve planes. This will give the Navy its desired air strength without a large increase in fiscal 1949 procurement funds such as was required to give impetus to the Congressional 70-Group Air Force program.

Air Force is now riding high in Congress as was indicated by the 343 to 3 vote in the House and the 74 to 2 victory in the Senate on the $822,000,000 additional procurement funds for the 70-Group program.

Both the 14,500 plane program and the 65,000 ton carrier prototype have been approved by the Joint Chiefs of Staff. Neither will require Congressional approval of additional funds in the next fiscal year although both projects will require substantial increased Navy appropriations in subsequent years. To sustain the 14,500 plane program Navy will require procurement of more than 3000 planes out of fiscal 1950 funds. This compares with 2727 new Air Force planes which have been authorized in the fiscal 1949 aviation procurement bill recently passed by Congressional action but as yet unsigned by the President.

▶ **Carrier Controversial**—The giant carrier program, one of the most controversial issues in the Air Force-Navy wranglings, originally called for six of the giant vessels but was pared to a prototype at the Joint Chiefs of Staff Key West conference last winter. Both Sen. Owen Brewster (R., Me.) and Rep. Carl Hinshaw (R., Calif.) leaders of the Joint Congressional Air Policy Board have been highly critical of the Navy's super-carrier program.

The new carrier will be 10 ft. longer than the former French liner Normandie and 70 ft. longer than the British liner Queen Mary. It will have an armored flight deck completely free of all superstructure to allow the use of planes with wing-spread wider than the 190 ft. deck. Two folding catapults will be installed on each side of the flight deck in addition to the two regular catapults normally carried on carriers. This will permit the new carrier to launch its first planes in quartets and is aimed at getting defensive fighters into the air speedily with the same amount of fuel for combat operations. This is particularly important with jet fighters.

**Carrier Specs**

| | Prototype | Midway |
|---|---|---|
| Displacement | 65,000 tons | 45,000 tons |
| Ship length | 1,030 ft. | 986 ft. |
| Flt. deck length | 1,090 ft. | 932 ft. |
| Flt. deck width | 190 ft. | 113 ft. |
| Top speed | 35 knots | 35 knots |
| Plane capacity | unknown | 120 planes |

▶ **Larger Planes**—The new carrier will be capable of handling planes at least up to 75,000 lb. gross weight but present plans do not go beyond bombers of about 40,000 lb. gross. This is about twice the weight of the heaviest bombers now operated off carriers. Navy planners believe that planes with a 1700 mile combat radius will be required for the giant carrier to permit carrier strikes on any target in the Eurasian land mass.

Bulk of the new carriers size will be devoted to additional storage space for fuel, ammunition and other materiel required to permit the carrier to operate at sea for longer periodics with higher combat intensity than the largest carriers now operational. Its speed will remain about the same as the Midway class carriers.

Navy strategists emphasize that the 65,000 ton carrier is a logical development from the Midway class and represents evolutionary rather than revolutionary progress in the long line of Navy carrier types. It has been in the design stage since the fall of 1945 and will require four years to build under peacetime conditions. With priorities for materials, the carrier could be launched in 32 months according to Admiral Louis Denfeld, chief of Naval Operations. Navy says it will be ready to begin building the vessel by next January.

## XF6U-1 Before . . . . . and After

**Production model F6U Pirate Navy jet fighter features new fuselage and tail lines (left). First airplane in the world to be fitted with an after-burner assembly in production the Pirate has greatly increased performance for short periods of time. The after-burner was designed and is being produced by Solar Aircraft Co., San Diego, Calif., and is used to increase the tailpipe temperature and stream velocity far above that permitted across the turbine blades and thereby increase engine thrust as much as 30 percent for takeoff and as high as 50 percent at best operating altitude and airplane speed. New faired tail surfaces feature dorsal and lumbar fins to improve stability at wide angles and new, short rudder extending only down to stabilizer. Compare new configuration with original "soup ladle" outline shown in original version (above).**

## Legislative Roundup

**Congress speeds action on civil aviation matters to meet adjournment date.**

Congress has stepped up action on civil aviation matters, as well as in other fields, to meet its June 19 adjournment target.

House Interstate and Foreign Commerce Committee, which has already held hearings on four bills proposed by the Congressional Aviation Policy Board, will begin work on another measure, designed to preclude multiple taxation of air carriers. This bill also was recommended by the Board. The House group has heard testimony on measures (1) providing for economic and safety regulation of contract carriers, (2) removing obstacles to airline financing, (3) reshuffling government agencies handling civil aviation, and (4) lodging jurisdiction over safety regulation with the Federal Government. Meanwhile, Senate Interstate and Foreign Commerce Committee opened hearings on the Board's bill bringing contract carriers under CAB economic and safety regulation.

Developments on civil aviation in Congress:

• **National Science Foundation**—Legislation approved by the Senate and expected to clear the House and get White House okay in near future. Bill eliminates President's primary objection—which brought a veto—to the National Science Foundation bill passed last year; instead of a 24-member board of part-time members selecting the Foundation's director, the President would appoint the director with the advice and consent of the Senate.

• **International Air Facilities**—CAA and Weather Bureau given sweeping pow-

ers to construct, or acquire, and operate facilities to promote U. S. international air transport program. Legislation approved by the Senate Interstate and Foreign Commerce Committee and, tentatively, by House Interstate and Foreign Commerce. CAA would be authorized to train foreign nationals to operate facilities. The bill, contemplated as the "international aviation facilities act," would open the way for CAA operation of numerous installations now held by the services.

• **Airport Program**—Contract authorization for the coming year boosted from the $34,392,000 approved by the House to $37,000,000 by the Senate in passing the Commerce Department appropriation bill. It is now pending before a joint conference committee of the two houses. Increase will permit construction of a field midway between Fort Worth and Dallas, opposed by Dallas interests on the grounds that airlines would use the midway airport and not make separate stops at Dallas. Senate increase would make $40,000,000 available for airport development next year (compared with $32,500,000 for the current year). Both houses approved $3,000,000 cash, in addition to the contract authorization, for airport construction.

• **CAA Funds** – Senate also added $112,600 for facilities at the air traffic control towers at New Bedford, Mass., Santa Rosa, Calif., and Colorado Springs, Colo., boosting House-approved total of $22,099,000–$10,099,000 cash and $12,000,000 contract authorization–for establishment of air navigation facilities. Senate concurred in House action giving CAA $82,451,000 for salaries and expenses (compared with $72,962,768 for the current year), $1,800,000 for technical development (compared with $1,600,000 for the current year), and $3,020,000 for the Washington National Airport (compared with $1,102,500 for the current year) including $1,835,000 for construction.

• **CAB Salaries**—An increase from $10,000 a year to $11,500 stipulated by the Senate in the Commerce Department appropriation measure. Senate concurred in House-approved proposal to increase CAB chairman's salary to $12,000. Senate accepted $3,450,000 allocated the Board for the coming year by the House. This compares with the Board's $3,040,000 budget for the current year.

• **Alaskan Airports**—Legislation authorizing $13,000,000 for construction of international airports at Fairbanks and Anchorage, already passed by the House, has also been approved by Senate Interstate and Foreign Commerce Committee.

• **Virgin Island Airports**—House Interstate and Foreign Commerce Committee reported out legislation extending provisions of 1946 federal-aid airport act to the Virgin Islands. There are now two airports on the islands—Benedict on St. Croix and Bourne on St. Thomas.

• **Airport Services** – Legislation, giving airlines a free hand to contract for fuel and other types of airline services, aside from that provided by airport managements, introduced by Rep. Leonard Hall (R., N. Y.). It prohibits charging of fees for such servicing and explicitly relieves airlines of any requirement "to use any storage, dispensing, or delivery system, equipment or facilities, operated by, or under contract with, the airport owner or operator."

• **Training Air Traffic** – Control-tower operators, both government and civilian, are authorized by Senate legislation. Training program would be carried on by CAA.

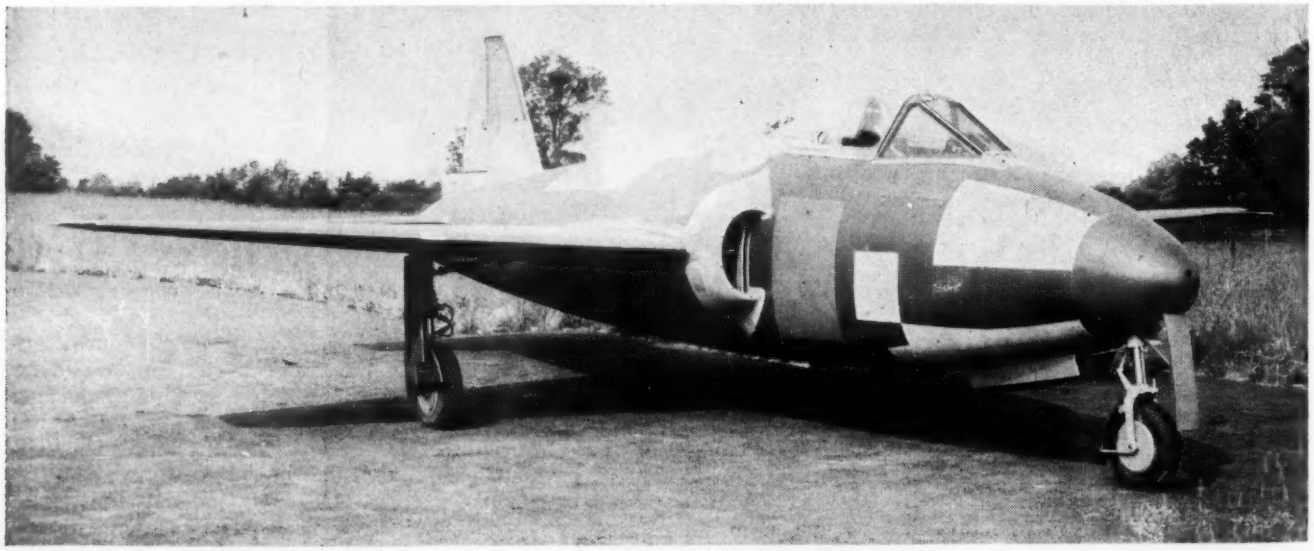
• **Civil Air Patrol**—Made a permanent auxiliary of Air Force under legislation approved by House and sent to Senate. CAP now functioning by virtue of authorization under war powers, scheduled for early revocation.

### CAA Review Board

A National Review Board to obtain uniformity in aircraft type certification is to be established by CAA (AVIATION WEEK, May 17).

Variations in the decisions of regional CAA type certification boards have been criticized in the past by aircraft manufacturers. The National Board will now be available for appeals or for settling controversial questions.

Charles F. Dycer, director of CAA's aircraft and components service, and his staff will serve on the National Review Board. Delos W. Rentzel, who will take office as civil aeronautics administrator June 1, and A. S. Koch, assistant administrator for safety regulations, will act in an advisory capacity when special problems arise.



**New Power, New Design for Gloster Jet—But Four Years Too Late**

**British Gloster E.1/44 has completed first test flights powered by Rolls-Royce Nene turbojet engine. Craft features flush riveting, thin cantilever wing and retractable tricycle landing gear. Air intakes on either side of cockpit direct air into central inlet to compressor. Fairing behind rudder contains spin parachute equipment for flight tests. Thin wing features dive-recovery and air brake flaps. Already four years old, the E.1/44 design will not be produced in quantity. (Crown Copyright Reserved)**

# INDUSTRY OBSERVER

**►Military fate of the all-wing design will probably be determined not by further orders for Northrop's giant B-35 and B-49, but by what happens to its flying wing design for a medium bomber submitted in the most recent USAF design competition. Northrop's all-wing design was the only unconventional plane submitted.**

►Current trend of USAF thinking away from larger planes makes it doubtful that the Boeing B-52 project will progress beyond its present mockup status. The giant, eight-engined plane was originally scheduled for a 450,000-lb. gross and has now been pared to about 375,000 lb. It is the sole survivor of a trio of projects that included the Convair XB-53 and Martin XB-51.

**►Convair is working on design studies of a tremendous flying LST, a project in which the Marines have major interest. This type would be used for airborne assaults and carry its own fighter planes, tanks and artillery.**

►Federal Aircraft of Minneapolis has developed a new type ski landing gear for transports. Navy has tested it successfully on DC-3s in Canada and Antarctica and the Air Force is now making further tests in Alaska on a C-82.

**►USAF has decided that all future military transport aircraft will be required to have CAA airworthiness certificates. No public announcement has been made yet. Tipoff is Northrop Aircraft's application to CAA for ATC on the trimotor Raider recently ordered by USAF. Execution of such a policy will assure airframe builders that when orders for military transports are completed they can perpetuate their production lines for commercial manufacture without long and costly delays in modifying the military airframe to meet commercial certification requirements. Northrop, for instance, hopes to get commercial orders for the Raider design after military requirements are fulfilled. This policy would be most effective in U. S. development of jet transports.**

►Further evidence of a setback in "pooled maintenance" promotion (AVIATION WEEK, May 10) comes in Western Air Lines plans to perform all engine overhaul, including magnetos and propellers, at its own shop at Los Angeles Air Terminal beginning in October. Up to now WAL has been a major customer of Pacific Airmotive Corp., which has preached the philosophy of pooled engine overhaul to relieve airlines of the costs of performing overhauls in limited numbers per month and of having to carry a heavy inventory of spare parts and overhaul equipment. Stanley R. Shatto, WAL vice president in charge of maintenance and engineering, cites an equipment investment of $100,000 to set up the airline's new engine shop, and believes that savings will amortize this sum in the first year of operation. He says that in farming out engine overhaul (to PAC) in 1947, Western's engine overhaul costs were above those of other comparable carriers. He believes the WAL engine shop will cut costs to industry average, or below. This estimate differs from evidence introduced at the Air Transport Association engineering and maintenance conference in Kansas City last month. The conference was told that eight engines per day was the break-even point between contract and airline overhaul. Western's engine overhaul program anticipates overhaul of no more than 20 engines per month.

**►USAF is concentrating all rocket test facilities on the firing range adjacent to Almogordo, N. M. air base. Three new firing ranges and extensive telemetering equipment will be added to the test facilities there.**

►An all-altitude speed course for testing planes and missiles through supersonic speeds is scheduled for construction at Muroc Air Force Base. Course will extend over 18 miles and use electronic equipment to provide precise data on high-speed flights. Muroc will also get more static rocket tests facilities indicative of increasing military interest in various types of rocket-propelled aircraft and missiles.

**►All USAF jet engine overhaul will be concentrated at the former Douglas plant at Oklahoma City. USAF wants to increase the size of its jet engine test facilities there to handle the proposed increase in jet work.**

►North American Aviation will lease from Douglas Aircraft an additional 10,000 sq. ft. of the latter's sprawling Long Beach, Calif., plant. Purpose is to expand B-45 jet bomber production line, now manned by more than 4000 workers. Space previously was occupied by Los Angeles County as a storage center. County was requested to surrender its occupancy.

## Pilot Suspended

Paul Edward Holzer, Pan American World Airways pilot, had his airline transport pilot's certificate suspended for 15 days by Joseph C. Caldwell, Jr., CAB examiner, for operating his plane in a "careless manner," Jan. 8, 1947, at the Seattle-Tacoma Airport.

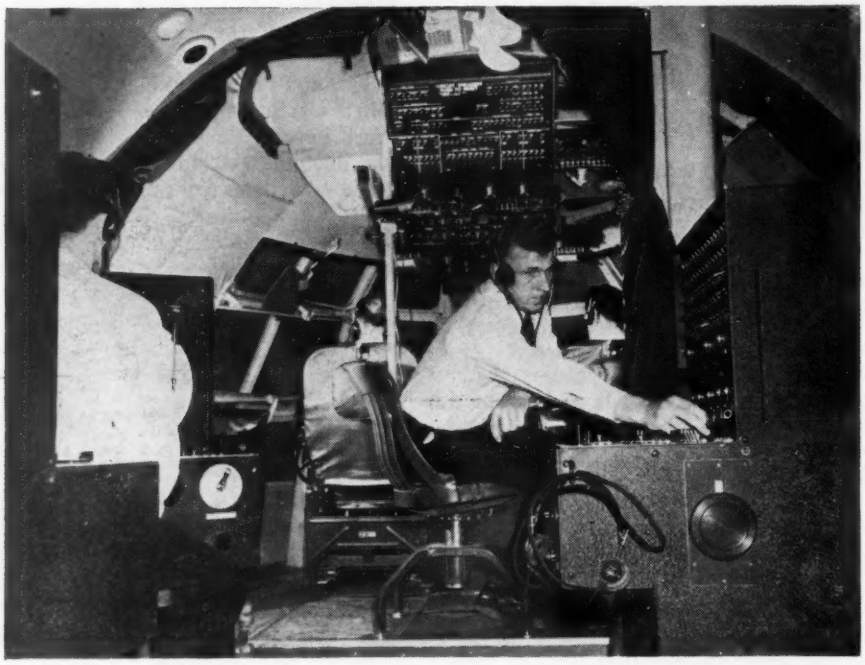
Holzer's plane, landing from Alaska, rolled off the runway and into underbrush beyond the field as the result of his operation, Caldwell found. The plane was damaged but the 17 occupants were unhurt.

In another decision, Caldwell suspended for 30 days the air-agency certificate of the Auburn Flying Service at Auburn, Wash., for not maintaining its facilities as required by the CAA and Civil Air Regulations.

## AVIATION CALENDAR

**May 27-28**—Third Annual Michigan Aeronautic Conference, Lansing, Mich.
**May 28**—ICAO legal committee, Geneva.
**May 29-30**—New England Seaplane Regatta (AOPA), Lake Winnipesaukee, N. H.
**May 30**—American Legion National Air Show, Berry Field, Nashville, Tenn.
**June 1**—ICAO second assembly, Palais Des National, Geneva, Switzerland.
**June 1-6**—Second annual all woman air show, Miami.
**June 5-13**—International lightplane tour of Italy, open to U. S. aircraft through National Aeronautic Association.
**June 6-11**—SAE Summer Meeting, French Lick Springs Hotel, French Lick, Ind.
**June 7**—Fifth annual personal aircraft meeting, Institute of the Aeronautical Sciences, Rackman Memorial, Detroit.
**June 8-10**—Airport Management Conference, College Station, Tex.
**June 9**—Fifth annual personal aircraft meeting, Institute of the Aeronautical Sciences, Hotel Allis, Wichita.
**June 10**—Fifth annual personal aircraft meeting, Institute of the Aeronautical Sciences, Engineers Club, Dayton.
**June 11-13**—Spring Air Cruise sponsored by Pennsylvania Aviation Trades Association, Williamsport, Pa.
**June 14-15**—Airlines Medical Directors Association, annual meeting, Royal York Hotel, Toronto.
**June 16-18**—19th annual meeting, Aero Medical Association, Royal York Hotel, Toronto.
**June 17-18**—Aviation Distributors and Manufacturers Association, Grand Hotel, Mackinac Island, Mich.
**June 21-25**—American Standards Association seminar by Dr. John Gaillard, Engineering Societies Building, New York.
**June 21-25**—1948 Annual meeting, American Society for Testing Materials, Detroit.
**June 22-23**—Annual Ohio State Aviation Clinic, Bowling Green.
**June 27-30**—Annual convention, National Aeronautic Association, Hotel Radison, Minneapolis, Minn.
**June 30-July 1**—National Soaring Contest, Elmira, N. Y.
**July 2-9**—Second National Air Tour Week, United Pilots and Mechanics Association.
**July 4-5**—Annual National Air Show, Port Columbus, Columbus, Ohio.
**July 13**—ICAO North Pacific regional meeting, Honolulu or Vancouver.
**July 14-15**—Institute of Aeronautical Sciences' annual summer meeting and dinner, Hotel Ambassador, Los Angeles.
**July 16-24**—Airport construction equipment display, American Road Builders Association, Soldiers Field, Chicago.

# ENGINEERING & PRODUCTION



INTERIOR view of the electronic flight simulator shows crew positions and instruments.

## C-W Unveils Flight Simulator

**Electronic flight-testing device could be answer to inexpensive crew training and brush-up courses.**

By STANLEY L. COLBERT

An electronic flight simulator for the Boeing 377 Stratocruiser has been unveiled by the Curtiss-Wright Corp. as the answer to inexpensive crew training and coordination, and periodic refresher pilot checks.

But its possible application goes far beyond use for any particular type of plane. Its manufacturers claim it is also: a research instrument to study "fields of potential flying hazards;" and an engineering device to "flight test" projected aircraft designs before construction.

▶ **Designed by C-W Engineer**—Conceived and designed by Dr. R. C. Dehmel, Curtiss-Wright engineer, in cooperation with the Boeing Airplane Co. and Pan American Airways, the simulator is a complete replica of the Stratocruiser cockpit.

The $200,000 device can simulate more than forty conditions during flight. Included:

Trouble with fuel flow, fuel pressure, fuel quantity, difficulties with oil pressure, carburetor icing, faulty spark plugs in a bank of any engine, circuit breaker overload, landing gear failure, flag failure, wing icing and rudder boost failure.

▶ **All the Instruments**—The interior of the simulator contains all the instruments of the actual craft. Controls of rudder, ailerons and elevators have the "feel" of the real airplane.

Familiar sounds are also duplicated by means of intricate devices. Engines actually cough, sputter and roar. Sound of the engine as it gathers momentum is accurately reproduced. When the "flight" is terminated, the screech of the tires is heard as the plane makes touchdown.

▶ **Theory of Simulator**—Theory for the development of the simulator is based on the known simultaneous differential equations which are used to represent factors affecting the flight of an aircraft, such as lift, drag and thrust. In this device, the equations are represented by the action of cams so that manipulation of the controls changes the equations just as in real aircraft. These changes are computed by a series of electronic "brains" and are reflected in terms of flight deck instrument readings.

All radio navigation aids, including ILS, markers, range, ADF and VHF signals are incorporated with switches available to simulate the failure of any or all of these features.

▶ **Advantages**—Obvious advantages of the electronic flight simulator:

- High standard indoctrination training of aircraft flight and ground crews.
- Training and checking for pre-flight and checkout procedures.
- Practical experimentation without risk.

Paring of high cost training flights for airline pilots is pointed to by Curtiss-Wright. Costs on four-engine transports vary between $600 and $1000 per hour. Mistakes on the part of a training crew can cause the loss of an airplane costing more than $1,000,000. The device can be used to replace 90 percent of training flights necessary to maintain flight crew proficiency in simulated emergenices as well as normal flight and radio aids efficiency. It also can reduce by one-third actual transition flight training in specific aircraft.

▶ **Cost of Operation**—Actual cost of operating the simulator is $50 an hour as against the $600-$1000 per hour for actual flight. With the simulator, risk to the aircraft and crew, and possibility of removing a revenue-providing transport from service are eliminated.

First commercial model of the simulator was built for Pan American Airways, which will train 70 complete crews in anticipation of delivery of Boeing Stratocruisers. A prototype military model of the simulator in the form of an AT-6 trainer has been purchased by the Air Force and is being tested by the Navy.

▶ **Without Risk**—As a research instrument the flight simulator makes it possible to study the mechanical and weather-produced "fields of potential hazard" which could not be explored before without risking damage or destruction of the aircraft or operating personnel.

As an engineering instrument, it makes possible practical "flight tests" of projected aircraft designs before the actual construction of design model is undertaken.

Curtiss-Wright President Guy Vaughan estimates that as a "training plane," the simulator "can handle four times the number of flight and ground crews at a tenth the cost and in a fraction of the time involved in the use of an actual airplane."

## Convair Plans Stock Issue

Consolidated Vultee Aircraft Corp. has filed a registration statement with the Securities and Exchange Commission for an offering of 1,159,849 shares of common stock.

# New Vice Presidents For Westinghouse

D. W. R. Morgan and John K. Hodnette have been elected vice presidents of Westinghouse Electric Corp.

Morgan joined Westinghouse in 1913. He will continue to direct operations at the South Philadelphia works, which includes the steam division and the Aviation Gas Turbine division, as well as the stoker division, Attica, N. Y.

Hodnette has been with the company since 1923. He was elected manager of the transformer division in 1946 and will continue on in that capacity in addition to assuming the responsibilities of his new post.

At the same time, Westinghouse named E. V. Huggins secretary of the corporation. He will head the company's legal activities.

In other personnel developments:

• **Koppers Co.'s** Piston Ring division appointed Lenvik Ylvisaker assistant general manager and Dr. T. C. Jarret manager of the engineering and development department.

• **Hamilton Standard Propellers division, United Aircraft Corp.,** promoted George Rosen to chief aerodynamicist. A graduate of MIT, Rosen aided in the refinement of propeller designs for combat aircraft during the war.

• **Tinnerman Products, Inc.,** made William M. Buttriss director of advertising and sales promotion. Prior to his present appointment, Buttriss was assistant sales manager of the company.

• **Goodyear Tire and Rubber Co.** named A. L. Adams sales engineer for the aviation products division with headquarters in Los Angeles. He was formerly manager of the company's export aeronautical sales in England and Europe.

• **The Health Company** has named Robert C. Sturken a partner in its firm of aviation engineers and consultants. Sturken will direct the development and promotion of a variety of new chemical specialties for the aircraft industry.

• **Aircraft Industries Association** appointed Theodore G. Haertel to assist George Hannaum, director of the industry planning service.

• **Weatherhead Co.** elected M. C. Peterson sales manager of the industrial hose division. A member of the Society of Automotive Engineers, Peterson was formerly associated with the Flex-O-Tube Co.

• **Monocoupe Corp.** named Millard K. Smart chief engineer. During the war, Smart was structures engineer for Curtiss-Wright, McDonnell Aircraft Corp., and Eastern Aircraft division of GM. Since that time he has been active in research and design of gas turbines.

• **Pacific Airmotive Corp.** appointed E. Van Vechten manufacturers sales manager. He will be in charge of sales to airframe manufacturers and the airlines.

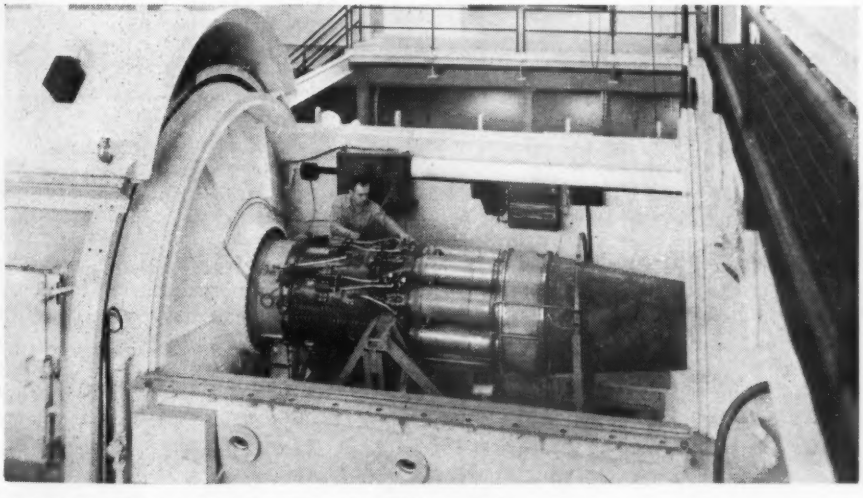
• **Borg-Warner Corp.** elected Robert W. Murphy general counsel. He succeeds G. A. Shallberg, who will continue as executive vice president of the corporation.

• **Chicago Pneumatic Tool Co.'s** vice president and director, Allan E. Goodhue, died Apr. 20 after a short illness. Goodhue joined the company in 1919 and managed company's interests in England until he was elected vice president in 1920.

• **Plomb Tool Co.** elected C. W. Coslow and M. M. Mautner directors. Coslow represents the entire manufacturing personnel of the Los Angeles plant and Mautner is in charge of the industrial relations department as well as secretary of the company.

• **Doman-Frasier Helicopters, Inc.'s** board membership was brought to ten by the election of Roy T. Hurley, Robert L. Nields, G. H. Niemeyer, Charles D. Agnew, Harry L. Brown, and B. J. Hamilton. Hurley, who will preside as chairman of the board, has had 28 yr. of top management experience in the aviation and automotive industries.

• **Lockheed Aircraft Service** elected B. A. Forrest, secretary-treasurer, to the board of directors.



## NACA's Altitude Jet Engine Test Chamber

First photo of jet engine altitude "tank" at the Flight Propulsion Research Laboratory of the National Advisory Committee for Aeronautics reveals compact design and ease of access to this new testing facility. Spacious roll-top doors permit installation and removal of engines and access for engineers. One of two such chambers, it is 10 ft. in diameter and 28 ft. long. The two new chambers were built to relieve the work load on the Altitude Wind Tunnel, designed to test complete aircraft propulsion systems but used over the past year almost exclusively for jet engine tests. The new chambers provide speeds that are up to near-sonic, altitude conditions simulating 50,000 ft. and temperature that drops as low as —48 deg. F.

# Temporary Injunction Won by Boeing

The Boeing Airplane Co. benefited from the first legal skirmish of the month-old strike when Superior Judge James B. Kinne signed a temporary injunction banning mass picketing. And after little initial success in a hiring campaign aimed at resuming normal plant production, the company reported job applications increasing.

▶ **Pickets Limited**—The injunction will remain in force pending trial of the company's suit for a permanent injunction banning mass picketing by the Aeronautical Mechanics Lodge 751. It limits the number of pickets to a total of 25 at seven gates at two plants and limits the union to peaceful picketing.

"Let's settle this thing up and get it over with," Judge Kinne advised both sides in granting the injunction. "It's not doing anyone any good. This strike is like the divorce cases a judge sees so often where the children are the real sufferers, because of their parents' bickerings. A little give and take would solve it. We've got to live and let live."

Four union men were brought into court on charges of ignoring the picket limitation imposed in a preliminary order by Presiding Superior Judge Roger J. Meakim but were freed when Judge Kinne held there was no evidence of "wilful contempt."

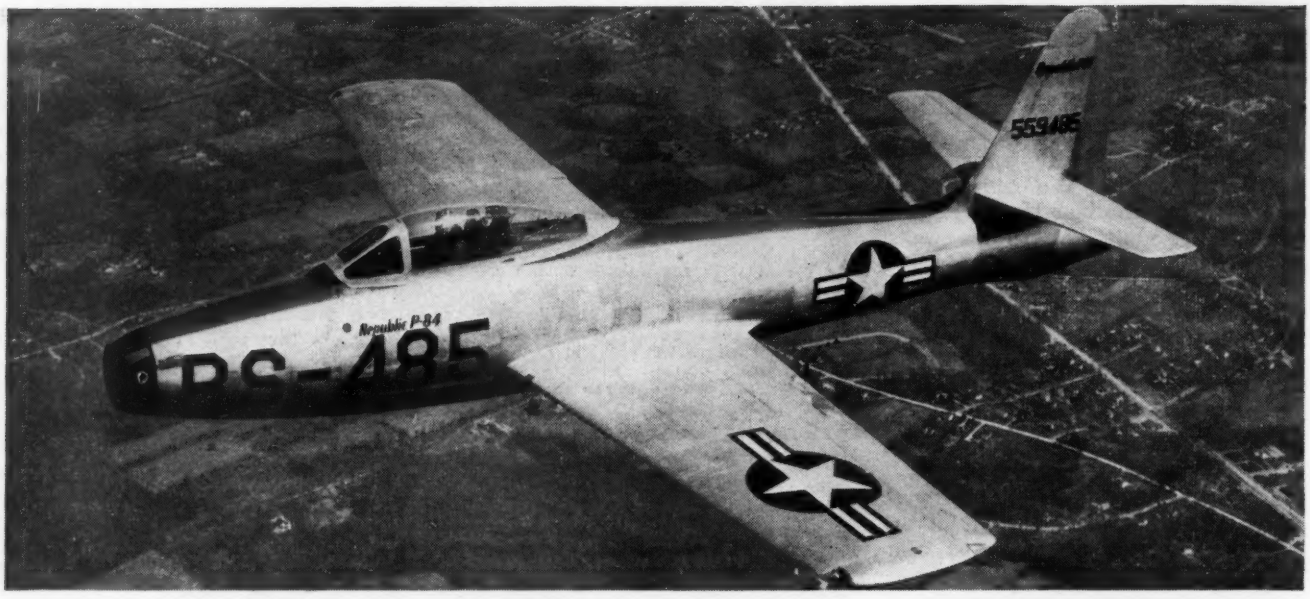
▶ **Union Increased Pickets**—The controversy arose when the union increased the number of pickets after reports the company was sponsoring a back-to-work movement. Few union men attempted to cross the picket lines although engineering and office department employes and most supervisors continued to do so.

The company backed its hiring campaign with advertisements declaring "the company is open for business" and calling attention to the federal law which forbids a union to strike illegally, to discriminate in future against employes crossing its picket lines, and to interfere with entrance to the plant through the use of coercion or intimidation.

▶ **Boeing's Position**—Boeing has declared that by striking without observing the required 60-day notice for a "cooling off period," the union violated the Taft-Hartley law and thus under this law has lost its right to represent Boeing mechanics for purposes of collective bargaining.

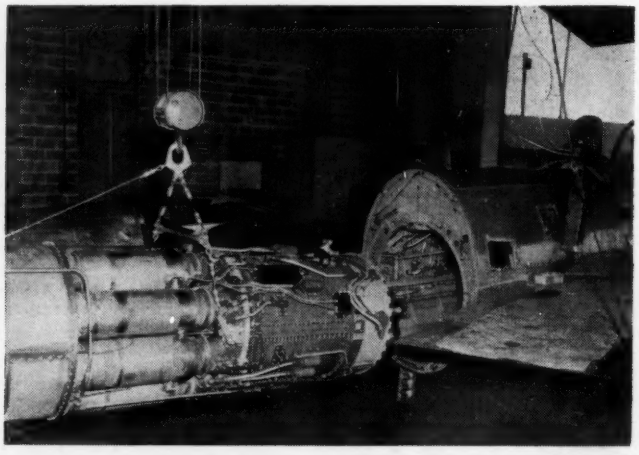
Spokesmen for the company said that nearly 500 hourly employes had gone to work since the beginning of the strike, about evenly divided between new employes and strikers.

Since the strike began, the company has transferred "several million dollars worth of work" to Wichita and to subcontractors in Oregon and California.




# Republic's P-84 Thunderjet Designed Around . . .

SEPARATION of fuselage exposes engine, also permits. . . .



THIS quick method to accomplish removal of entire power plant.

# A Specific Engine Type, the Axial-Flow J-35

**New fighter created to prove value of straight-through air flow, in contrast to competitive-bid contract method.**

By ROBERT McLARREN

Certification of the Republic P-84B Thunderjet as fully operational (AVIATION WEEK, April 26) signifies the completion of initial experimental and service tests and its designation as a "standard" Air Force turbojet-powered fighter.

This brings to fruition three and one-half years of work on a new design and permits examination of its salient features, chief one being the "straight through" airflow design, in which ram air is taken in at the nose and exhausted at the tail.

► **Basis for Contracts**—Following successful flight tests with the Bell XP-59A, first U. S. jet plane, the (then) Army Air Forces decided to order for production fighter aircraft powered by the two major types of gas turbine engines.

Lockheed received the contract for development and production of a fighter (P-80 Shooting Star) based on the J-33 centrifugal-flow turbojet, and Republic the contract for development and production of a fighter (P-84 Thunderjet) based on the J-35 axial-flow turbojet.

Maj. Gen. Oliver P. Echols (ret.), now president of Aircraft Industries Association and wartime chief of Air Materiel Command, recently told the President's Air Policy Commission that the contracts were assigned to these companies for two reasons: (1) It was desired to develop these new engines quickly, and (2) both Republic and Lockheed had received production cutbacks in their AAF fighter aircraft (P-47 Thunderbolt and P-38 Lightning, respectively). A third consideration was the extensive experience both had in single-seat fighter design and development.

► **Engine Influences Design**—Thus, the XP-84 was created as a specific design problem based on a given engine rather than the more common competitive proposal method based on performance.

ON RUNWAYS

THE WORLD OVER

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**North American B-45 • North American P-86**
**Boeing B-50**

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The J-35 engine weighs about 2,500 lb., is 12 ft. long and 37½ in. in diameter. This immediately suggested a long, thin fuselage, ideal for the purpose.

To permit placement of the pilot well forward, the inlet air was divided into two rectangular ducts aft of the nose inlet. These ducts extend along the skin on either side of the fuselage to a Y air inlet assembly on the front of engine, the air entering the circular intake.

Space between ducts contains the nose wheel and strut, two interconnected fuel tanks (capacity of 130 gal.) and also contains the pilot's cabin and equipment.

▶ **Engine Tipped Down**—To clear the pressurized portion of the fuselage in this region, the ducts extend down along the side and then rise upward. To eliminate losses associated with duct bends, the engine was tipped down 4 deg. to permit a straight connection with the inlet air ducts.

This, in turn, required a similar 4-deg. bend aft of engine at the connection between the engine tailcone and the airplane tailpipe, the efflux leaving the tail of the craft parallel to the fuselage horizontal reference line.

Although concern was expressed early in the project over the possibility that inertia effects generated by these changes in flow direction might adversely affect stability, subsequent test flights proved that these effects substantially cancel each other.

▶ **Access to Engine**—The Air Force specified that the design of the XP-84 should permit a complete engine change in 50 min. To meet this requirement, Republic engineers split the fuselage normal to the longitudinal axis at a station just aft of the main engine mounting trunnions, permitting the rear fuselage assembly to be rolled away, exposing the power plant from the rear of the compressor aft.

The engine was mounted on an overhead track on which the forward mounting support slides and two horizontal guides on which the two horizontal trunnions slide. Service experience has since shown that the guides are unnecessary, and only the main overhead track is used.

▶ **Ducting Loss Problems**—Considerable difficulty was experienced with leakage in the 15-ft. duct sections extending aft from the nose, causing early concern for thrust loss during takeoff. Auxiliary air inlets near the compressor inlet were studied but their complexity outweighed thrust saving and only about 4 percent loss in static thrust is experienced with the present arrangement.

Losses in the engine Y-duct were reduced by use of sealing compound and a decrease in fastener spacing.

▶ **Tailcone-Tailpipe Splice**—Most complex problem was the splice between the engine tailcone and airplane tailpipe, which might appear to be a fairly straightforward engineering job.

However, three requirements complicated the problem: (1) The engine manufacturer insisted that the bending moment placed on the tailcone be held to a minimum; (2) the joint had to be able to withstand an axial load of 6,000 lb. created by the exhaust gases; and (3) the joint had to be quick-detachable.

More routine requirements included a leak-tight, temperature-resistant, and flexible joint to accommodate thermal-expansion.

Republic engineers solved this problem by providing an adapter assembly attached to the engine tailcone, clamped strap fitted around the flanged joint, Cook Electric bellows assembly to achieve leak-tightness, and four slotted strap assemblies in which the attaching pins ride.

An early service difficulty with this arrangement developed in the clamp, which featured a toggle on one side and a turnbuckle assembly on opposite side. An access hole in the fuselage bottom permitted adjustment of the turnbuckle only after loosening the clamp and rotating it 180 deg., after which it had to be rotated back to its position atop the joint. This feature was eliminated and a simple porthole bolt fitting into a slotted ear was utilized on the P-84B model.

▶ **Tailpipe Shroud**—Next in complexity but more easily solved was the problem of tailpipe cooling. The original design study contemplated the use of an insulating blanket around the tailpipe to prevent heat damage to the surrounding airframe. This covering scheme was abandoned because: (1) The blanket appeared heavier than a comparable metal shroud, (2) it retains the heat in the tailpipe whereas a shroud conducts it away, (3) absorption of oil by the blanket causes considerable smoke in flight, and (4) a blanket creates a fire hazard with its resultant fuel leakage and absorption.

Accordingly, shroud cooling utilizing the ejector principle was adopted. This consists of a metal shroud encircling the tailpipe from its forward end to a point 19 in. ahead of the nozzle. The jet efflux comprises the primary mass flow of high-velocity air. Air within the shroud, taken aboard through louvres, comprises the secondary mass flow of low-velocity air. The result is a pumping action on the secondary flow, which conducts tailpipe heat away from the airframe.

Against an arbitrary upper limit of 250 deg. F. set for the airframe, maximum skin temperature so far experienced is 220 deg. F. and maximum frame temperature 279 deg. F., the latter being considered satisfactory for the frame materials used.

Use of this ejector costs between 100-150 lb. of static thrust, but this is considered worthwhile to attain adequate tailpipe cooling.

▶ **Nozzle Area Problem**—Thrust variations in various J-35 production engines proved a problem on the XP-84, in which thrust sensitivity to nozzle diameter was first indicated accurately. A difference of only ⅛ in. in nozzle diameter produces a change of 135 lb. in takeoff thrust. Original General Electric calculations indicated a nozzle area of 200 sq. in., or about a 16-in. diameter.

As production engines became available it became clear that each unit produced a slightly different thrust, requiring slight changes in nozzle area, not easily made.

The 198-sq. in. nozzle of the XP-84 was enlarged to as much as 207 sq. in. during the original test program. First J-35-3 engines delivered by Chevrolet Div., General Motors Corp., required a nozzle area of 210 sq. in. And early J-35s produced at the G.E.'s Schenectady and Lynn plants varied in nozzle area requirements. To solve the problem, Republic designed a nozzle with a tapered lip on which scribe marks ⅛ in. apart were made. Mechanics used these scribe marks as guides to trim the nozzles to accommodate these thrust variations.

However, after this taper had been trimmed to its root circumference, it was then necessary to replace the entire nozzle upon installation of a new engine. This difficulty has been solved by use of small inserts fitting inside a joggled retainer and held in place by two stainless steel screws. A set of 10 inserts, allowing a total variation of 10 sq. in. in nozzle area in 1-in. increments, is now provided.

▶ **Wing Tip Tank Factors**—Wind tunnel studies undertaken to determine optimum location for auxiliary fuel tanks indicated the extreme tip in the plane of the wing as most suitable.

Contradicting the expected drag of these installations, the XP-84 tanks actually reduce the drag of the airplane by providing an increase in effective wing aspect ratio at high lift coefficients. This is brought about by the action of the tank as an end plate reducing the magnitude of the tip vortices.

The tip position provides increased effective dihedral and thereby aids stability by creating increased rolling moments with increased angles of yaw.

The P-84B wing tip tanks (capacity 185 gal. each) contain landing lights in the nose and position lights in the tank tip.

▶ **Wing Makeup**—The P-84B wing makes liberal use of 75ST aluminum alloy for both internal structure and skin in gages ranging from 0.040 to 0.125.

It utilizes multicell construction in

which the skin carries all of the load. The webs serve only to stabilize the skin by displacing it as far as possible from the neutral axis and to divide the skin into a series of panels of small width-to-thickness ratio to attain high critical compressive stresses. This structure comprises a "structual chord," comparable to the familiar box beam of wings utilizing two spars with connecting ribs. Non-load-carrying leading and trailing edges extend this chord to the aerodynamic chord, these edges providing aerodynamic form only.

The structure is designed to fail homogeneously; that is, the compressive instability of the skin is attained simultaneously with bending instability of the webs. This theory of design, developed by Republic's George Gerard, is considerably more efficient than conventional design in which skin buckling at limit load factor is followed by a further 50 percent increase in load until ultimate load factor of the spar beams is reached.

Skin sheets, tapered in spanwise direction to further increase structural efficiency, vary from nearly 0.5 in. at the root to 0.040 near the tip.

▶ **Hydraulic Boost**—To obtain maximum maneuverability and simultaneously keep control stick forces within stated requirements, the P-84B utilizes hydraulic boost on the ailerons and rudder, and elevator slots are sealed. Other routine fighter requirements have been met: Pressurized cabin with temperature control, pilot ejection seat, air brakes (hydraulically actuated double-skin door in the fuselage belly under the wing leading edge), flush riveting, power (electrical) operated canopy, and other equipment.

▶ **First Flights**—Design of the XP-84 was undertaken in the fall of '44 and it was ordered for quantity production in December of that year, the contract specifying 3 experimental and 100 production airplanes together with spares and equipment at a total of $26,633,265.

The prototype was completed in November, 1945. It made its first test flight on February 27, 1946, with Major Wallace A. Lien at the controls.

The No. 2 plane flew in August, 1946, and on Sept. 7 established a new U. S. speed record of 611 mph. Subsequently a speed of 619 mph was attained.

Production accelerated during the year and 30 P-84s were delivered to Muroc and Wright Field for pilot training. First airplane tactically assigned was delivered to the 14th Fighter Wing, Dow Field, Maine, in November, 1947, and the total complement of 78 aircraft was completed in mid-February, 1948. Five other fighter groups are scheduled to receive P-84s during the year, to make a total of 600 in service.

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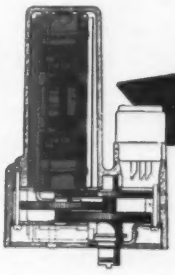

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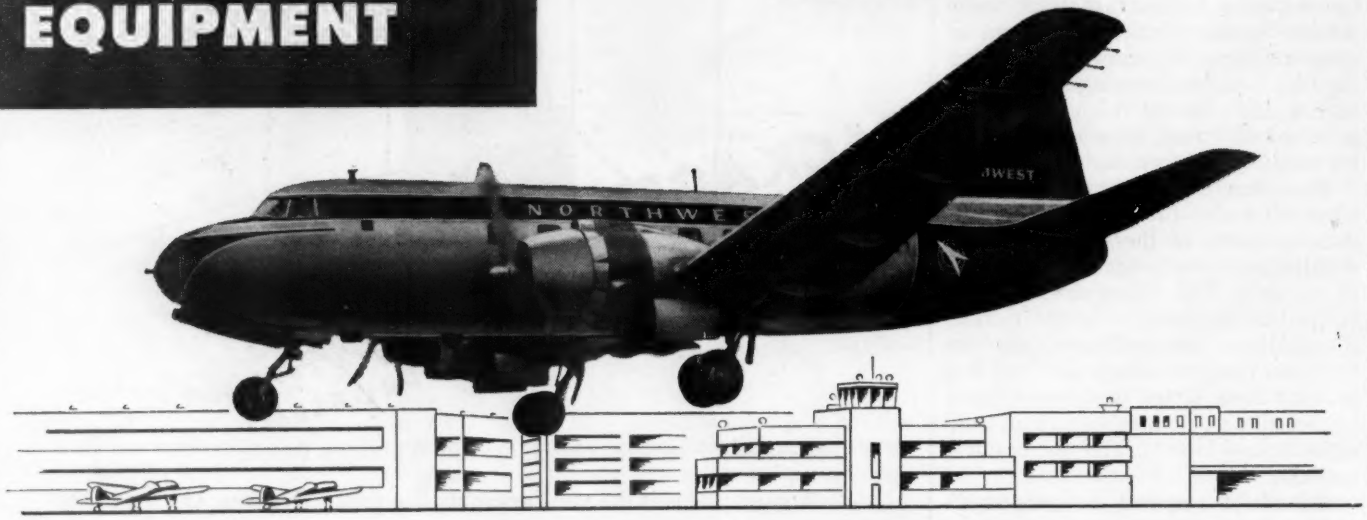


## NORTHWEST AIRLINES' MARTIN 202'S

One of the first postwar designs in commercial operation . . . Northwest Airlines' Martin 202's . . . makes extensive use of Vickers Hydraulic Equipment.

To meet the exacting requirements of this new air transport, Vickers perfected a "dual pressure" hydraulic system having a single power source and requiring minimum weight per horsepower. The 3000 psi system is subject to intermittently high power requirements such as landing gear and flap actuation. The 1500 psi system meets the more or less continual demands which exist both during flight and while on the ground. Typical of this duty are windshield wipers, brakes, nose wheel steering and loading ramp operation.

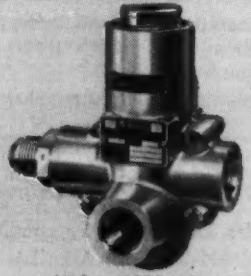
The 3000 psi system is of the "open center type" which permits free flow of oil back to reservoir at negligible pressure when no power is required.

The 1500 psi system is of the "closed center type" incorporating an accumulator. The accumulator provides for the storage of an adequate supply of oil under pressure to meet normal operating requirements. Thus the pump runs unloaded except when demands upon the system exceed the capacity of the accumulator.

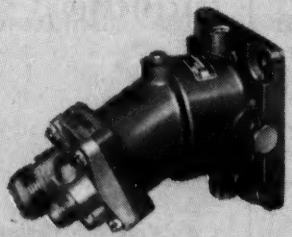
As both the 3000 psi and 1500 psi systems have a common power source, a pressure reducing valve is placed between the unloading valve and the accumulator in the 1500 psi system, to insure against overload in the accumulator.

These important features are but a few of the many advantages offered by Vickers Hydraulic Equipment which is helping Northwest Airlines and their 202's achieve a new measure of operational efficiency. For more detailed information, write for Bulletin 46-41.

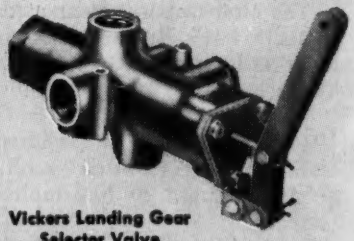
Vickers 3000 psi Reducing-Relief Valve



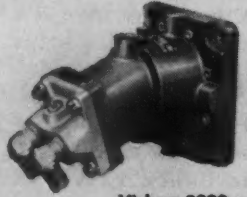
Vickers 3000 psi Unloading Valve



Vickers 3000 psi Constant Displacement Piston Type Pump



Vickers Landing Gear Selector Valve



Vickers 3000 psi Constant Displacement Piston Type Motor

Vickers Flap Selector Valve

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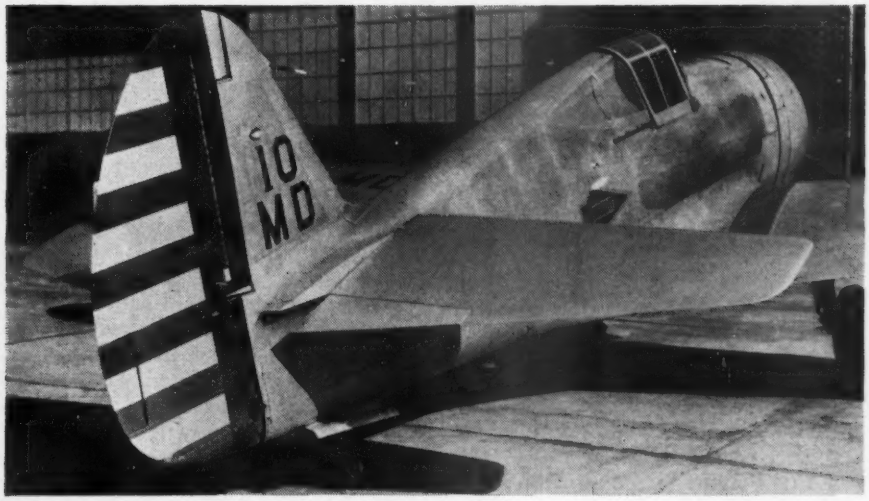
*ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921*

**In research work on aspects of control with the all-movable vertical tail, NACA utilized this modified version of the Fairchild-22.**




**This all-movable horizontal tail installation on the Curtiss XP-42 was employed in NACA research studies on longitudinal control devices for use at very high speed conditions.**

# Case Against the Vertical Fin

## NACA experiments with all-movable tail surfaces indicate advantages in personal and transonic planes.

Why a vertical fin?

This component has been a basic part of the airplane for so long that the suggestion that it be omitted might have been ridiculed only a few years ago.

But curious engineers of the National Advisory Committee for Aeronautics have concluded that it may well have outlived its usefulness. They have advanced their contention both experimentally and theoretically and work on the problems is continuing.

▶ **Function of Fin**—Textbooks of only a dozen years ago give as the function of the vertical stabilizer: "To provide directional stability in the event the rudder is carried away in flight." More prevalent reason is the usefulness of the fin as a structural unit on which to "hang" the rudder.

NACA engineers are convinced that neither of these reasons are of sufficient merit today to warrant carrying this substantially useless surface millions of miles per month.

▶ **If Fin Were Omitted**—Elimination of the fin would provide several important advantages. It would reduce the drag of the airplane, the problem of control surface balancing, and stick forces, and eliminate undesirable force variations with surface deflections. Also, it may well provide one answer to the control problems of transonic speed.

With these considerable rewards in prospect, the NACA has investigated the problem of all-movable tail surfaces.[1,2]

▶ **Study All-Movable Tail**—First step was an examination of an all-movable vertical tail surface of the type used for many years on gliders and sailplanes, with one important modification.

The vertical surface on previous installations exhibited a tendency to trail into the wind with the surface free, and to suffer unstable variations of control force with the attitude of the airplane.

The NACA sought to solve this problem by locating the surface pivot behind the aerodynamic center and to add a trailing edge plain flap, which deflects in the same direction as the main surface.

This arrangement causes the surface to float against the wind, providing a restoring moment in constant ratio with the change in wind angle. The narrow trailing-edge flap increases the lift of the main surface and provides the restoring moment necessary to stabilize the main surface about its pivot.

▶ **Safety Feature**—Tendency of the all-movable vertical surface to float against the wind would provide an important safety feature in multi-engine aircraft experiencing engine failure producing asymmetric thrust.

In the event of sudden engine failure, the aircraft will develop a substantial amount of yaw before the pilot is able to apply rudder against the thrust. Size of the conventional vertical surface on multi-engine aircraft is determined largely by this consideration.

The tendency of the all-movable tail to float against the wind provides corrective action immediately upon the beginning of the yaw and thereby provides a powerful factor of safety.

► **Reduces Surface Area**—That the all-movable tail can reduce the area of the surface by approximately 50 percent is seen in the fact that for a given movement of the controls, the all-movable tail will develop twice as much lift (normal to the wind) at zero yaw as the conventional tail.

Answering the need for structural strength in the absence of the fin is the use of a slightly thicker section permitting equivalent structure on the interior without the added drag of the fin.

► **Vertical Tail Flight-Tested** – Flight tests of an all-movable vertical tail have been carried out on a small monoplane (Fairchild XR2K-1-commercial Model 22) at the NACA Langley lab.

In a preliminary investigation, the all-movable tail was made the same area as the conventional tail. The tests indicated that the all-movable tail performed satisfactorily in all respects. Flying the airplane differed in no essential respects from flying with conventional fin and rudder.

The all-movable tail proved capable of producing greater force per unit area than the conventional tail. The pilot was even able to make satisfactory normal turns with the all-movable tail using only the stick.

► **Horizontal Tail Checked**—NACA examination of an all-movable horizontal tail followed a radically different approach and produced substantially different results, although the action of the surface is much the same as that of the vertical tail.

Advantage of the all-movable horizontal tail in this NACA investigation was to reduce the difficulties of longitudinal balance and control at high Mach numbers.

As compressibility occurs on the main wing, it creates changes in the downwash over the tail. This results in large (and often unpredictable) pitching moments which amplify the piloting problem and, in extreme cases, exceed the ability of the pilot to control them.

► **Tail Designed**—For this problem, the NACA designed a horizontal tail pivoted at the aerodynamic center of the surface (instead of behind it, as in the vertical surface case) to provide substantially zero changes in stick forces with elevator deflection and changes in tail angle of attack.

This renders the control stick impervious to changes in the tail load, flow direction at the tail, center-of-gravity of the airplane, power and flap effects, altitude, and the downwash created by compressibility.

Such an arrangement would permit an airplane to meet landing requirements with a considerably greater range of C. G. travel than is now possible.

► **Horizontal Tail Tested**—For the test airplane (Curtiss XP-42 single-seat fighter) the all-movable horizontal surface was provided with a bobweight in the control system, also a servotab control to provide pilot "feel" and to trim out undesirable forces that might develop during the experiment. Because the bobweight provided feel only during flight accelerations, no control forces were experienced during ground taxiing or in steady flight.

Flight tests of this tail were made, including abrupt pullups and sudden movement of the controls followed by their release.

Indications were that the airplane was longitudinally stable under both stick-free and stick-fixed conditions, that it could be trimmed throughout the speed range of the tests, that oscillations were damped satisfactorily, and that a stick-force gradient in steady turns of about 8 lb./ G was developed.

► **Pilot Observations**—Satisfactory as these tests were, the pilot considered the control too sensitive, requiring constant attention in rough air. Insufficient variation of stick force with control movement was an additional complaint. These comments, however, result from the particular configuration tested, and both control sensitivity and control force variation are easily corrected in the test arrangement.

Both of these NACA tests are of a preliminary nature to explore the possibilities of the all-movable tail. Additional experiment is clearly warranted by the promise of the design.

For the personal aircraft, the all-movable tail would reduce manufacturing costs, simplify balance changes, hence flight techniques, and improve performance.

For the multi-engine airplane an additional safety factor is promised. And for transonic aircraft, solution to their basic control problem looms in the foreseeable future.

**References**

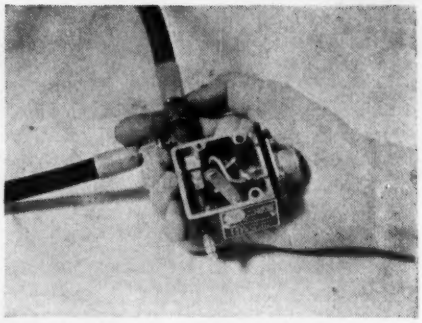

1. Jones, Robert T. and Kleckner, Harold F.: Theory and Preliminary Flight Tests of an All-Movable Vertical Tail Surface. NACA Wartime Report L-496

2. Kleckner, Harold F.: Preliminary Flight Research on an All-Movable Horizontal Tail as a Longitudinal Control for Flight at High Mach Numbers. NACA Wartime Report L-89


## Trainer Into Production

The Fairey Aviation Co., Ltd., Hayes, Middlesex, is scheduling its new primary trainer plane for "immediate production."

Designated the Fairey Primer, the plane was developed as a replacement for the Magister and Tiger Moth trainers. It is powered by either a 145-hp. de Havilland Gipsy Major 10 or a 155-hp. Blackburn Cirrus Series III engine.



## New Switch Shows Pressure Discharge

A novel latching switch actuated electrically and mechanically to give a visual indication of pressure discharges or excessive pressures has been devised by L. J. Bordelon, Convair's chief flight engineer.

Developed for use in the Convair-Liner fire extinguishing system, the switch is actuated by pressure from the $CO_2$ supply when the system is discharged in engine or baggage compartments. The device thus obviates necessity of weighing of $CO_2$ bottles to determine if they are empty.

The unit's connector plug has three leads, one for normally closed and one for normally open side of the switch, as well as the power lead.

► **Multiple Warnings**—Flight deck indication is via a light which remains on to remind pilot that main and/or reserve $CO_2$ has been used.

The small piston inside the box is red, and when the switch is actuated, the red portion is exposed outside the box, also indicating discharge.

The electrical circuit can be checked by simply pulling out the re-set knob which forms the end of the actuating piston. This actuates the switch by cam action of the piston, as if $CO_2$ pressure had moved the piston.

Another indication of discharge is via a small decal seal covering an opening in the switch casing. Inside the switch box, a small hole, opened when the piston is displaced, bleeds off pressure and permits the gas to blow the decal seal.

The switch is located adjacent to the bottles and is re-set manually after they have been replaced.

► **Other Uses**—No oiled parts are employed, making the unit satisfactory for use with oxygen installations.

The device has also been used on other planes equipped with combustion-type heaters. It is connected to the air ducts, and if backfire or explosion occurs in the heater, the switch is actuated, cutting off the fuel and ignition. Operation of the heater can then be restored only on the ground.

The unit is being made commercially by Airite Products Co., Los Angeles.

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Above, Spartan Aero Repair, Central Airport, Camden, New Jersey.

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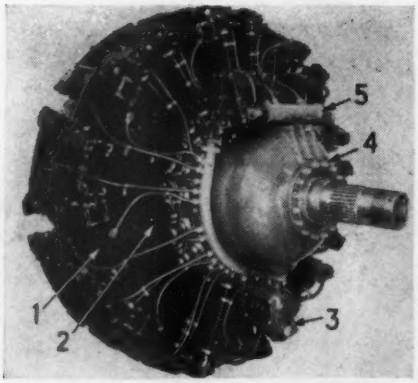
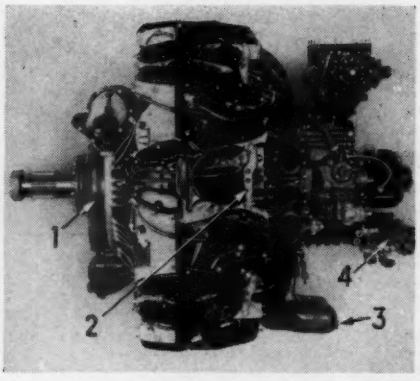
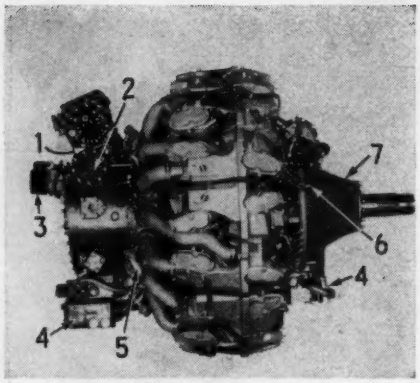



1937—R3350-1, -2, -3 delivered 1700 hp. for takeoff, used 100 octane fuel. Engine had: 1, Cast aluminum cylinder head; 2, steel barrel fins; 3, sump only (no pump); 4, 2:1 reduction gear; and 5, non-supercharged ignition. Crankcase suspension was used, and 12-in. supercharger impeller (single or two speed) was employed.




1939—R3350-4, -5 delivered 2000-hp., also used 100 octane fuel. Changes indicated are: 1, Shorter nose section housing improved gear system with 16:7 gear ratio; 2, cylinder head suspension brackets; 3, rear sump; and 4, oil pump. Two-speed supercharger impeller, also a 12-in. unit, was fitted with a double clutch.




1941—R3350-23 (used in B-29) was 2200-hp. plant using 100 octane fuel. Features: 1, Carburetor adapter eliminated; 2, fuel injection added here later; 3, supercharged magneto; 4, sump and pump combined; 5, crankcase Lord mount; 6, supercharged ignition; and 7, 20:7 reduction gear. Other details are shown in the cutaway view.

# From 1700 to 2700 Horsepower in 10 Years

## Wright Cyclone 18 conceived as simple combination of two nine-cylinder engines, but evolved into new unit.

Trace the genealogy of an aircraft engine and you will probably find that it has a certain set of blood-lines as well defined as those of a Derby winner.

The Wright Cyclone 18 (R3350-) is a good example. Its history shows that engine development is essentially evolutionary—and costly and complex. In little more than a decade since it first went on the boards, the Cyclone 18 has cost the Air Force, Navy, and Wright more than $34 million in engineering development alone. One series, the 2200-hp. C18BA, went into 18 distinct production models, and other series of the engine also represented scores of separate models.

► **Early Experiments**—This engine is, in many ways, a direct descendant of the Cyclone 9 which was powering a majority of the country's airliners in the late 1930s.

When the need for larger, more powerful engines became apparent in that period, Wright engineers began experimenting with two Cyclone 9s joined at 45 deg. to a common gearbox.

Although bulky, this experimental engine was an attempt to capitalize immediately on the economy and ruggedness of the nine cylinder engine, which had logged thousands of hours in commercial and military flight.

The Cyclone 9 was producing 1000 hp. at the time the duplex arrangement was attempted, and it could therefore be expected that the twin engine arrangement would have a rating of 2000 hp. However, practical limitations caused the abandonment of the project. There were duplications of many important accessories—the carburetors, magnetos, superchargers, and many other vital parts—plus the added gearbox weight.

► **Design An 18-Cylinder Engine**—The project was shelved (it never got beyond the mockup stage), and in 1936 Wright began the design of an eighteen cylinder, two-row engine of 3350-cu. in. displacement, which was to be the basis of the type for more than a decade.

The first Cyclone 18 went on test in the Wright experimental department in 1937. Its center was a crankcase made up of sections from two Cyclone 9 crankcases.

This steel case, plus the cylinder design, piston and ring arrangement, and the solid master and articulated rods proved on the Cyclone 9 were incorporated into the new design. Experience gained on two-throw crankshafts in the Cyclone 14 was also "plowed back" into the larger engine, and with a number of later refinements, these features have remained with the engine in more than ten years of development.

► **Horsepower Upped**—The following year, the first Cyclone 18s, at 1800 hp., were delivered to the Army and Navy for experimental flight and test work. These engines had a 2:1 planetary reduction gear housed in an especially long, pointed nose section. Some of the engines were equipped with two speed superchargers and approximately a like number were single speed.

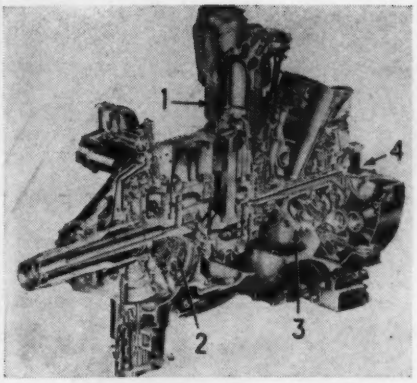
In 1939, the Cyclone 18 reached 2000 hp., the first to attain that output. That same year, it was flown for the first time in the twin-engine Consolidated Model 31 flying boat, later taken over by the Navy and rechristened the XP4Y. In this engine the reduction gear had been changed to 16:7 ratio, the nose was shortened considerably, and two-speed superchargers with double clutches were installed as standard equipment.

By this time, out at Burbank, Lockheed was at work on the C-69 Constellation which was to use the Cyclone 18 in both its military and commercial versions.

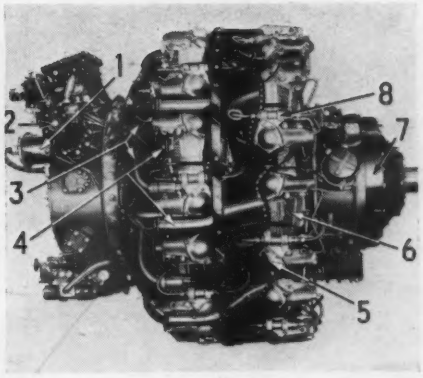
► **Rear Section Changed**—In the same year that the Cyclone 18 reached the 2000 hp. mark, the (then) Army Air Forces placed limited order for a 2200-hp. model. This engine had a redesigned rear section to accommodate a larger number of accessory drives than did its predecessors, and was to be produced with either a single or two-speed supercharger. The Boeing B-29 program, however, later called for all single-speed-blower engines to be used with turbosuperchargers. The new engine was also designed for crankcase suspension and had oil pumps at front and rear.

Experimental testing continued through 1939 and '40, during the same period in which Wright Aeronautical was beginning its expansion under the stimulus of British, French, and American orders for engines. This expansion, however, was for production of Whirlwind engines for tanks and trainers, Cyclone 9s for B-17s and Lodestars, and Cyclone 14s for such craft as the B-25.

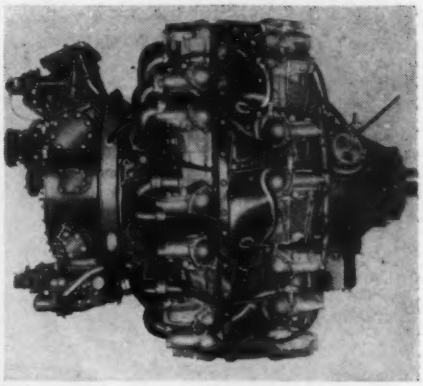
► **Testing for Production**—In 1941,




1941—This is cutaway view of the 2200-hp. R-3350-23. power plant. Disclosed here are: 1, Aluminum-finned cylinder barrel; 2, second order balancer; 3, supercharger impeller, 13-in. single speed installation, complemented by a turbosupercharger; and 4, simplified rear section. Evidenced is compactness of design features.




1945—Cyclone 18BD, 2500-hp. engine using 100/130 fuel: 1, Low tension generator; 2, fuel injection; 3, Y-type intake pipes; 4, all rear exhaust; 5, smaller rocker box covers with close-spaced studs for effective oil seal; 6, forged aluminum head; 7, 16:7 reduction gear; and 8, low-tension ignition with high tension coils at heads.



1947—R3350-26W (C18CA) is 2700-hp. (dry) engine using 115/145 fuel. It weighs 2848 lb. as against smaller power, 2884-lb. C18BD; has lightweight high-tension ignition system (arrow) for lower altitude operation than C18BD; water injection; fuel injection at impeller; MAP regulator for altitude changes; and 16:7 reduction gear.

months before Pearl Harbor, while the expansion for smaller engines was still under way and the Cyclone 18 was still in its early experimental stages, the AAF asked Wright to plan immediately for large scale production of the engine.

One of the first steps was the construction of 30-ft. test cells to speed the gathering of operational data. Cells built for smaller power plants had proved inadequate for high-power running, and the object at this stage was to pile up quickly the hours of the test-and-try by which every aircraft engine is developed to the production stage.

▶**Used in B-19, Mars**—Late in 1941 four Cyclone 18s took aloft the Douglas B-19, world's largest landplane. A few months later the Martin Mars, powered by the same type engines, flew for the first time.

The B-19 never fired a shot or dropped a bomb over enemy territory, but its test flights proved that big bombers—and big engines—for long range and heavy loads were entirely practical. The Mars was destined for a long and useful life with the Navy even after its experimental days were over.

In addition to the original Mars, four production planes known as the JRM-1s, were fitted with Cyclone 18s.

The Boeing XPBB-1, a twin-engine Navy patrol bomber which appeared in 1942, was also powered by two Cyclone 18s.

In the same year, the Army Air Forces more than tripled its original order for the 18.

The Paterson plants of the company were heavily loaded with war production, and the Cincinnati plant was getting into stride on the Cyclone 14. A new plant, specifically designed to turn out the big engine, was the only answer.

In May of '42, ground was broken for a plant in Wood-Ridge, N. J. Although the Cincinnati plant was later to turn out a number of Cyclone 18s, and the Dodge Chicago Division was later licensed to build the engine in mass production, the Wood-Ridge plant was to carry the production load through the critical, early stages of the B-29 program.

▶**Produce 2300-hp. Engine** – Meanwhile, in the Paterson plant, limited production was started on a new model of the Cyclone 18, the "BB" engine of 2300 hp., which topped the B-29 power plant's output by 100 hp. By 1943 the BB model was installed in the Martin JRM-1 Mars, Lockheed P2V-1, Curtiss XF14C-1 and XBTC-1, and the Douglas XSB2D-1, which later evolved into the production model BTD.

Although it was less than six years since the first experimental Cyclone 18 had been run, the engineering costs by '43 were approaching $10 million for wages and materials, excluding the costs of expanding facilities such as test cells and other engineering equipment.

▶**New Reduction Gear**—The B-29 program was now taking definite shape, and a decision on the tactical operation of the Superfortress prompted the Army to ask Wright for a major change. The B-29 was to be a high-altitude long range bomber, and would need big propellers turning at low speeds for maximum cruising efficiency.

But the Cyclone 18 turned at a higher rpm. than its predecessors, and this, coupled with the far higher output of the engine, made the design and manufacture of the new 20:7 reduction gear a new and difficult problem. This was the major point of design of the Cyclone 18 in which experience gained in earlier models and in smaller predecessors was of little value.

The problem was solved with an entirely new type reduction gearing using 20 pinions with silver bushings and an increased "overlap"—a greater proportion of the gear surfaces being in contact at all times, resulting in a wider distribution of load.

And second order vibration, common to radial engines because of the elliptical path of the articulated rods, was reduced sharply by installation of two balancers at either end of the crankcase.

With the redesign of the engine, the torquemeter, installed in a great many of the early models, was eliminated.

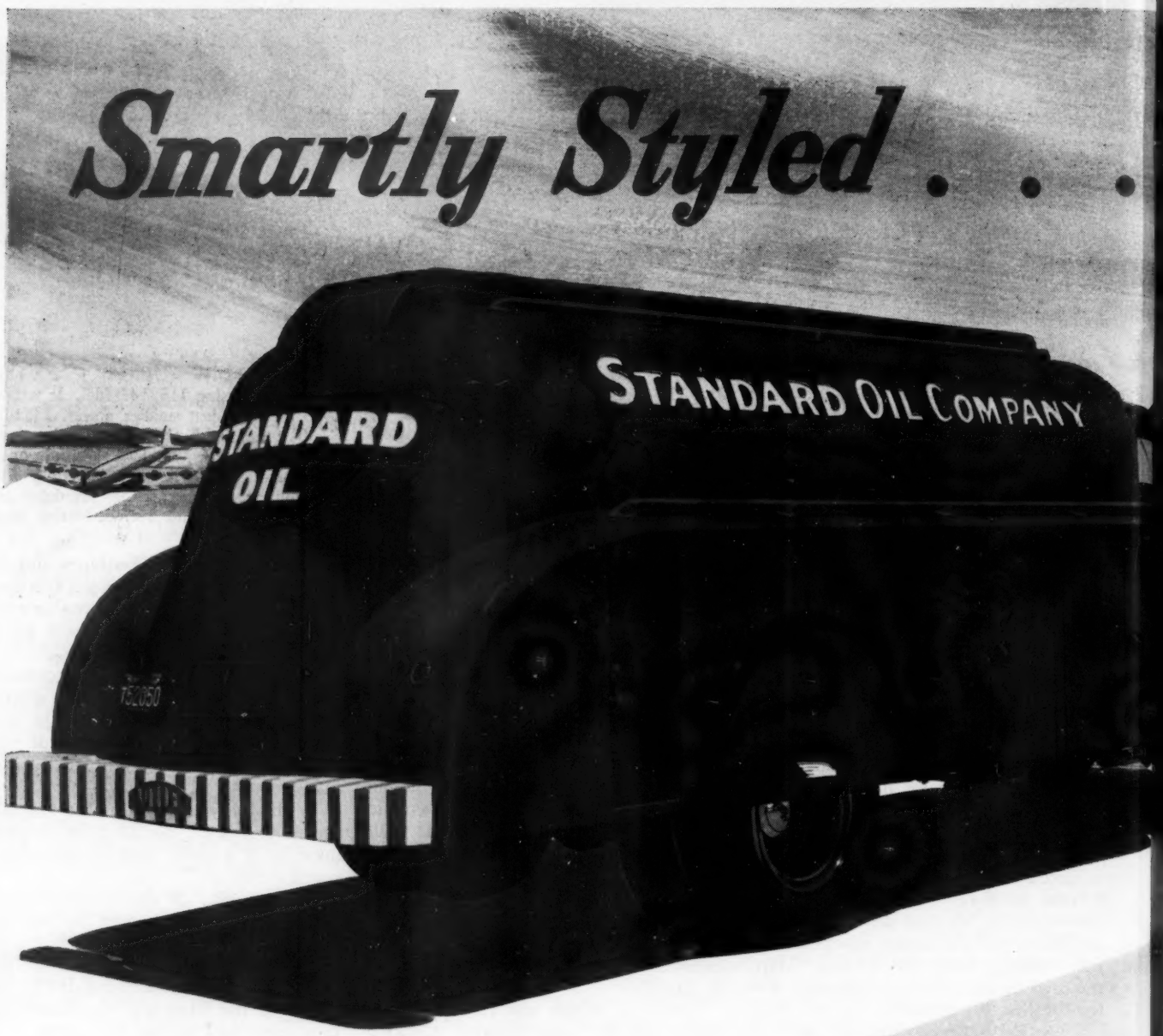
The solution of the reduction gear problem in the 18 opened the way for resumption of production. Engines with the 20:7 ratio were turned out for the B-29 and the Consolidated B-32, but those for the Mars and the Constellation continued to use the earlier 16:7 ratio.

▶**Fuel Injection Incorporated**—In 1944, Wright began installing direct fuel injection on some of the 18s. This was intended to improve cooling and fuel distribution by shooting fuel at high pressure into each cylinder. It also had the effect of eliminating the fire hazard of mixed air and gasoline existing in carburetor-equipped engines, and permitted more economical operation.

The total war production of the Cyclone 18 by Wright Aeronautical was slightly over 13,000 units, 1592 of which were built at the Ohio plant.

As an indication of the lag which separates the original idea from the production phase, there was an output of only 72 Cyclone 18s between 1940 and 1942. Maximum production was not achieved until 1945 (through V-J Day), when a combined total of 7006 engines were built in the Wood-Ridge, Paterson, and Cincinnati plants.

▶**Other Developments**—The end of the war did not bring the end of develop-

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ment on the Cyclone 18 power plant.

The Navy had actually taken over sponsorship of further refinement in 1943, after the Air Forces production program got under way. In 1945 the BD model of the engine, designated the R3350-24W by the Navy, was installed in the Lockheed P2V-2 and the Douglas AD-1 dive bomber.

The commercial model of the engine, rated also at 2500 hp., was announced as the power plant for the long-range Models 649 and 749 Constellation. The 18 had, by this time, logged 10 million hours of flight.

The BD engines, which are still in production for the Constellation, have forged aluminum cylinder heads, direct fuel injection, and low tension ignition systems. The BA model of 2200 hp., similar to the B-29 powerplant, is still installed in the Model 49 Constellation, which went into worldwide commercial service immediately after the war.

The C18CA (R3350-26W) for the Navy, announced this year, is the most powerful of the Cyclone 18 series to be put into production. Wright Aeronautical recently received a $17 million production contract for this engine to be used in Navy patrol and dive bombing aircraft. Rated at 2700 hp. dry and with a much higher rating with water injection, the CA model represents an increase of more than 1000 hp. over the original 18 first tested little more than a decade ago.

Although development of the 18 by constant refinement is not ended, the additional application of a turbine compounding system to the engine promises eventually to raise its normal output to a point near the one horsepower per cubic inch ratio.

## Information Tips

**For Cockpit Canopies**

Data is available from **B. F. Goodrich Co.**, Akron, Ohio on its new method of making rubber seals under pressure for cockpit canopies. Units are specially molded so that splices and rough edges are avoided.

**Relay Guide**

To facilitate selection of relays for electronic control equipment, new booklet is issued by **Allied Control Co.**, 2 East End Ave., N. Y. C. Compact, space-saving units of varied types are illustrated and specified.

**On Metal Cutting Tools**

Of interest to production engineers is carbide tipped tool catalog released by **Chicago-Latrobe Twist Drill Works**, 411 West Ontario St., Chicago, Ill. Included are specifications on drills and reamers together with suggested speeds given in surface ft./sec.

**Welding Methods**

For producers and fabricators of aviation equipment, 8-page bulletin "Production Issue" is announced by **Eutectic Welding Alloys Corp.**, 40 Worth St., N. Y. C. Booklet describes and illustrates metals, techniques, and applications for both oxyacetylene and arc users.

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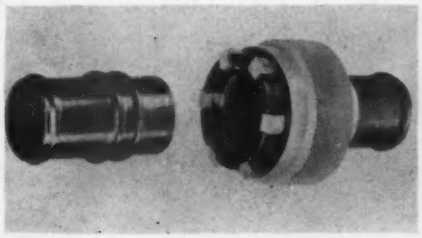
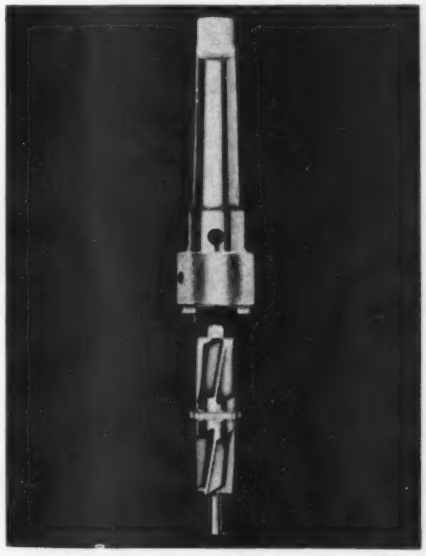


### Fluid Line Disconnect

Quick disconnect coupling, "Insto-Matic," is made by **E. B. Wiggins Oil Tool Co.**, Los Angeles, Calif., for use on aircraft jettisonable fuel tanks. Advantages claimed include dog-locking action plus vibration-resistance and sealing. Plugs and sockets are constructed of anodized aluminum alloy, with component steel actuating springs; poppet-type valves with Hycar gaskets; and aluminum alloy or steel dog locks. Connections include flared tube ends, hose connections, and male and female pipe threads. Sizes vary from ¼ to 1½ in.

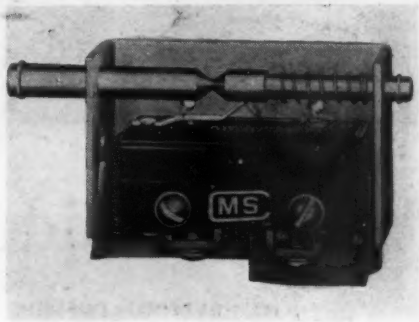


### For Counterboring Operations

Applicable to machine shop phases of aviation industry is new counterbore, with cutting edges at both ends. Made by **Plan-O-Mill Corp.**, 1511 East Eight Mile Rd., Hazel Park, Mich., tool is available in range of sizes in high speed steel or with tungsten carbide inserts. Single and multi-diameter styles are offered, with or without pilots. Two types of holders, collet and sleeve, provide for easy tool replacement and furnish position drive with runout of less than .002 in. Advantages claimed: Double life of single end tools; longer operation; and decreased inventories.

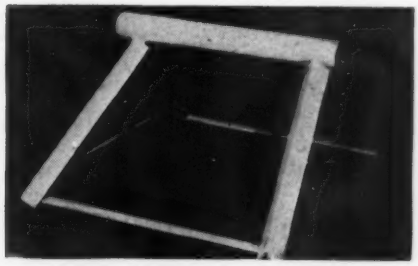
### Protects Spray Equipment

Designed to eliminate corrosion or clogging of spray gun equipment is automatic water unloader for removing water and oil from air compressor tank. Made by **A. Shelburne Co.**, 739 Ceres Ave., Los Angeles, Calif., device is intended to fit electrically operated compressors equipped with centrifugal or magnetic unloader.



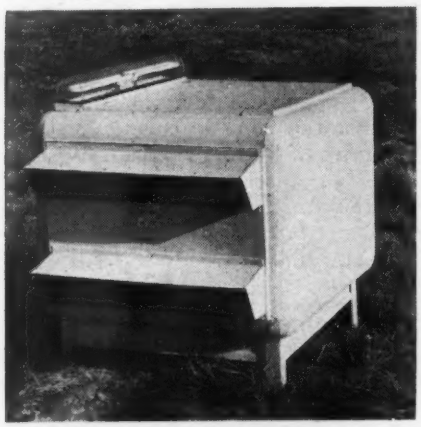

### Safety Switch

Interlocking switch for use on radar, high frequency radio, induction heating equipment, and electronic controls is designed to assure safety by automatically cutting off power circuit when equipment door is opened. Device protects repair or test personnel when mechanism is serviced, and circuit can be closed for checking by manually moving actuator, eliminating necessity of "tying-down" conventional switch or putting jumper across terminals. Maker is **Micro Switch,** Freeport, Ill.

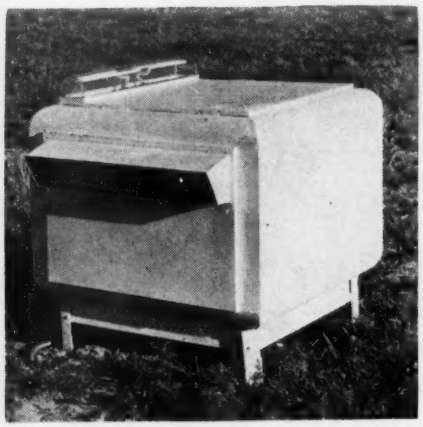


### For Chocking Landing Wheels

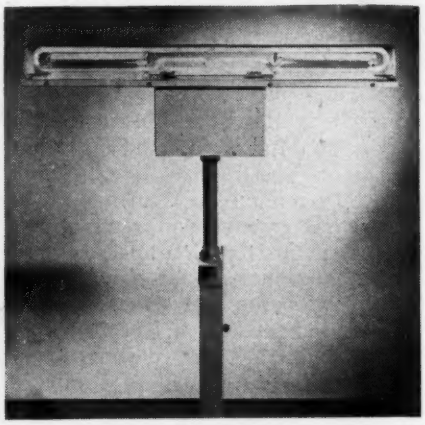
Wheel chock, accommodating all diameters of aircraft tires on small personal types and large transports, is offered by **Graymar Co.**, P.O. Box 2021, Wilshire-LaBrea Sta., Los Angeles, Calif. Available in three sizes—13½ × 26 × 24, 9× 19 × 17, and 6 × 12 × 10 in., with corresponding weights of 26, 16, and 10 lb.—each model is reversible. Member against which tire is forced, under run-up pressure, is 2-in. pipe. Non-skid points are provided.



Approach



Ground Contact



Runway Marker

# Lighted Glide-Path for Small Airports

**Four-unit system costing $1500 claimed to increase income for operators by making night flying easy.**

MINNEAPOLIS—A lighted glide-path is the latest proposal to aid night landings at small airports. It is part of a new-type system that includes approach lighting and runway markers for a relatively inexpensive $1500.

Demonstrated at Stanton airport near here in connection with the Minnesota Aviation Trades Association show, it drew enthusiastic comments from airport operators and pilots, who flew the system, including an AVIATION WEEK correspondent.

At present there are two fixed installations, at Parks' Metropolitan Airpark, East St. Louis, and at Sylvan Beach Airport, near St. Louis. Manufacturer, Aviation Equipment Corp., is located at St. Louis.

▶ **After Dark Revenue**—Earl Hoffman, vice president-sales of the company, claims the operators using the lighted glide-path are finding it makes possible additional income. "They say they can add four or five hours of flying time to the use of their planes each day. They have taken to the idea of night sightseeing trips. One operator clocked more than $150 worth of such trips in one week."

Hoffman also reports interest on the part of the operators in running overnight "supper" flights instead of the now-usual "breakfast" flights.

▶ **Four Units**—The system, invented by Kenneth Gausch, president of the manufacturing company, comprises four units: approach light, ground contact light, runway marker light and a threshold light. All are neon and argon gas tubes and, except for the threshold light, are located alongside of and perpendicular to the runway.

The approach unit, containing one red and one green light, is the most distinctive part of the system. It is placed up to 200 ft. from the end of the runway, on the left side. Red and green lights show through two louvres on the front of the unit. Mounted on top, toward the rear, is a single 30-inch white light which serves as a runway marker. It cannot be seen when the approach lights are in view.

The ground contact light is placed in line with the approach light, as far up the runway as 2000 ft. Individual runway markers also are 30-inch white lights. These are installed along the edge of the runway in line with the ground contact and approach units and at optional spacing.

Only one runway light was used at Stanton in what company officials called their "basic airport lighting system." With a marker light on top of both the approach and ground contact units, and with the runway marker between them, pilots found they had three lights on each side of the runway (approach lights at each end of the runway) to help line up.

▶ **Construction**—Approach and ground contact units are sheet metal, 30 inches high, wide and deep. Marker units are 20 to 30 inches high and the runway lights are mounted on a metal base with a plastic cover. A one-inch conduit pipe with shear groove coupling and disconnect plug holds the unit off the ground.

There are two horizontal slots cut in the front of the approach unit. The lower has a green light, the upper a red. When a pilot makes a proper approach to the runway at night he sees both red

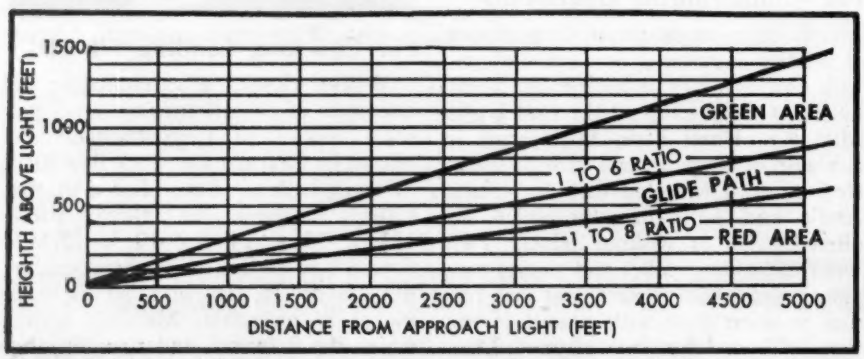



**Chart of lighted glide path: on correct approach, pilot sees both red and green lights.**

# a new Ferret Set by Snap-on

## A new design... strong... adaptable... they squeeze into close places easily

(All units 3/8" Square Drive)
1/4" and 5/16" Single Broached Sockets
11—Double Broached Sockets from 5/8" to 7/8"
1—Speeder Wrench
1—8" Ratchet
1—Sliding Tee
1—Nut Spinner
1—Universal Joint
3", 6", and 12" Extensions
—Complete in a metal box, 19½" x 5¾" x 1⅜" — specially designed for this set. Rich red enamel finish.

Yes, a new Ferret set . . . new in design . . . way over par in performance — and they're twice as strong as you would expect such slim, slender handles and thin-walled sockets to be.

They squeeze into tight places and get those hard-to-reach nuts and bolts that defy the ordinary type wrench. Newly designed by Snap-on engineers, they make quick easy work of many of the tough jobs on modern motors and engines.

Be sure to ask your "Snap-on" man to show this set the next time he calls.

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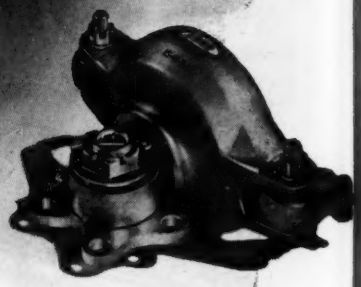
# For dependable engine suspension

## Lockheed *Uses* LORD Dynafocals



**RS-40G ASSEMBLY**

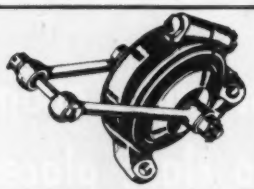
[ Consists of six RS-40G-SA sub-assemblies ]

**For LOCKHEED "CONSTELLATION"**
**DOUGLAS AD-1 & AD-2**
**MARTIN "MARS" (JRM-1)**
Using Wright R-3350-C18BB and C18BD engines

**RL-35 ASSEMBLY**

[ Consists of nine RL-35-SA sub-assemblies ]

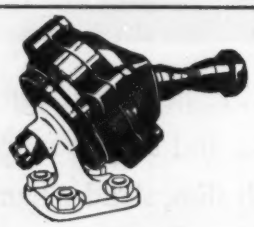
**For LOCKHEED "CONSTELLATION"** Using Wright R-3350 A & B Series Engines



**MR-26 ASSEMBLY**

[ Consists of eight MR-26-SA sub-assemblies ]

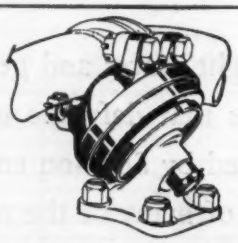
**For DOUGLAS DC-4 (C-54)**
Using Pratt & Whitney R-2000 Series Engines



**MR-36, MR-36F, and MR-36J ASSEMBLIES**

[ Consists of six MR-36-SA; six MR-36F-SA; two MR-36J-SA and four MR-36J-SA1 sub-assemblies respectively ]

**For CONSOLIDATED "240"**
**CURTISS CW-20 (C-46)**
**DOUGLAS DC-6 (C-112)**
**FAIRCHILD "PACKET" (C-82)**
**MARTIN 202**
**MARTIN 303**



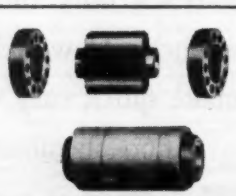
Using Pratt & Whitney R-2800 A&B Series Engines, use MR-36
Pratt & Whitney R-2800C Series Engines, use MR-36F, MR-36J

Like Lockheed, you too can profit by specifying Lord Dynafocals for engine suspensions. Here's why:

1) New high quality rubber stock that insures maximum service life.
2) Advanced design, with superior vibration isolation and positive safety features.
3) Low weight, without loss of strength or performance.
4) Exact selection to suit your requirements from Lord's complete range of Dynafocal types and sizes.

You'll want these advantages when buying replacements . . . and you'll get all of them by specifying Lord Dynafocals. For additional information, write to Lord . . . Headquarters for Vibration Control Systems.

*Lord builds a complete line of Dynafocals for practically all engines, all aircraft. Check your requirements with this list. And write for your copy of the Lord Service and Maintenance Manual containing valuable information on maintenance problems, suggestions for increased service life, and parts lists.*



**LORD ENGINE MOUNTINGS for DC-3**

| Item | P & W 1830 Series Quantity Per Plane | P & W 1830 Series Part Number | Wright 1820 Series Quantity Per Plane | Wright 1820 Series Part Number |
|---|---|---|---|---|
| Tube Mounting | 8 | J1202-1 | 8 | H5013-3 |
| Insert | 16 | J1789-1 | 18 | SK1925-1 |
| Sandwich | 32 | SK1292-1 | 36 | SK1292-2 |

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Canadian Representative: Railway & Power Engineering Corp., Ltd.

and green lights. The glide angle is adjusted to a 1-to-7 ratio. Other ratios can be set up.

▶ **Operation**—If he is too high, the pilot sees only a green light. Therefore, he slows his glide a little and sinks down until the red light shows with the green. If he sees only the red light, he knows he is too low and that he should give the ship power and climb a little until the green light shows with the red.

When both red and green are seen, the pilot is making the proper rate of descent to make a good landing near the end of the runway. He also knows that the glide path ahead is clear of obstructions.

Adjustments for crosswinds and drift are made by checking the position of the plane against the runway marker lights.

As he nears the ground, the pilot begins to see the ground contact light ahead. This unit has a single slot in the front which shows a blue light. The pilot first picks up the blue light when he is ten or 15 ft. off the ground and about the time, if he is maintaining his glide properly, he passes the approach lights. As soon as the blue ground contact light begins to show, he begins to ease back on the controls in preparation for a landing. As the blue light becomes more pronounced, he holds the ship off more and more.

▶ **Technique**—"Just watch the blue light and maintain your direction down the runway, flaring off as the blue light gets more intense. Then you'll 'grease 'er in' better than you can in broad daylight," says Gausch.

Pilots who tested the lights at Stanton found that nearly every one made perfect landings without looking for the ground which, in poor weather, they couldn't see anyway.

"Malcolm Manuel, Stanton airport operator, soloed all his students interested in night flying after going three times around the field with them," says Gausch. "Most students made better landings by following the lights than they were in the habit of doing in the daytime."

▶ **Installation**—Cost of the basic unit includes two approach and ground contact lights (one for each end of the runway); two runway markers and four green threshold lights, together with all the necessary wire.

Installation has been made simple so that the airport operator can do it himself. Wire is covered with Neoprene to make it possible to bury it in the ground with safety and assurance that it will last. With the proper measurements of a runway, Aviation Equipment will cut the wire and mold plugs on it (CAA-approved type) to field specifications.

# New Airplanes for Old . . .

# In Luscombe 'Silvairizing' Process

**How a refurbished but out-of-date Taylorcraft can be turned in for an all-metal Luscombe Silvaire 65.**

Natural inclination of almost every aircraft service operator to try his hand at "horse-trading" is a principal attraction of the Luscombe "Silvairizing" process.

Case history of Bill Shipp, operator of the Georgetown, Tex., Flying Service, illustrates this. He started out with an old Taylorcraft L-2 and ended up with an all-metal mostly new Luscombe Silvaire 65, illustrates this intricate process.

First Shipp bought the Taylorcraft for $250 after it had been in dead storage in his hangar with an expired license for more than a year. Then he bought a Piper Cub trainer for $500 which had an almost new 135-hr. Continental 65-hp. engine. He transferred the Continental engine to the Taylorcraft, and put an old 2300-hr. Franklin engine he had in the shop in the Cub. Next he traded the Franklin-powered Cub for a Stearman crop-duster valued at $1000.

When he took the old liaison plane with almost new engine on a ferry permit into Dallas for Silvairizing, he figured that he was already $250 ahead on his transactions. In addition Luscombe gave him a trade-in value of $1000 for the usable engine and parts of the old plane which were put into the all-metal Luscombe he received in return.

How Luscombe Airplane Corp. works its Silvairizing process is illustrated by the pictures. At top, Bill Shipp turns over the papers on the Taylorcraft to W. D. Fridge, Luscombe representative. Lower photo shows Bob Whitney and Herbert Allen from Georgetown taking delivery on the Silvaire 65 all-metal Luscombe, on which their old airplane was traded.

Now Shipp has an old Continental engine which he took out of the L-2, a Stearman Crop duster, and the Silvairized Luscombe 65. He is studying how to "horse trade" the old Continental up into another Silvairized Luscombe.

With such a broad bargaining background, the chances are that he'll find a way.

# Personal Plane Accidents Analyzed

A structural failure of a wing strut fitting, explosion of an air-fuel mixture in a wingpanel, and poor pilot judgment were indicated as probable causes for three personal-type plane accidents analyzed recently by the CAB.

• **Ft. Lauderdale, Fla.**—A Piper Cub J-3 trainer crashed May 26, 1947, as a result of structural failure of the left front lower lift strut fitting, while performing maneuvers in an instructor's rating examination. Commercial pilot George C. Hastings and CAA Inspector John R. Hartwell were fatally injured. Both had parachutes. Examination of wreckage indicated plane struck ground in inverted diving attitude, and that left wing was partly free from fuselage at impact. Plane had been repaired May 7, after windstorm damage, including installation of wing lift struts, salvaged from another plane. Microscopic examination indicated that a shoulder machined on the threaded insert at the inner end of the strut had failed because of fatigue.

• **Ada, Okla.**—A North American Navion crashed Apr. 13, 1947, as a probable result of an explosion in the right wing panel, which may have been ignited by operation of the landing gear position switch. Pilots Tom and Frank Norris and their wives were fatally injured and the plane was destroyed. Plane left Hot Springs, Ark., to fly to Walker Field, Ada. Observers saw the plane come out of overcast and make approach to Walker Field at about 100-ft. altitude. Almost simultaneously with extension of nosewheel, witnesses saw smoke, heard an explosive sound, and the right wing appeared to disintegrate.

Investigation indicated a fuel-air mixture in wing panel caused by leaks from tank or seepage into panel.

• **Christiansburg, Va.**—A Spartan 7W crashed into a fog-covered mountain, Oct. 20, 1946. Commercial pilot Harry C. Hippert, employed by Lynchburg Air Transport and Sales Corp., and passengers, Dr. Preston Burton and Dr. Gilbert Burton, were killed. Plane was on a cross-country flight from Roanoke, Va., to South Dakota. Investigators reported a possibility of a slight flash fire of less than one minute duration in the engine immediately after the crash, but there was no indication of a fire during flight. Plane was seen flying low and entering overcast in a climbing attitude near the place where it collided with a tree on the mountain, crashed and burned. Probable cause for the accident, CAB reports, was the pilot's attempt to continue visual flight into instrument weather over mountainous terrain.

## BRIEFING FOR DEALERS & DISTRIBUTORS

**POWER LINE COMPLAINT—Cook Cleland, 1947 Thompson Trophy race winner, has asked the Public Utilities Commission of Ohio to order Cleveland Electric Illuminating Co. to relocate a powerline which runs within 350 ft. of a runway of Euclid Avenue Airport, near Cleveland, operated by the speed flyer. At the hearing, S. P. Randall, Ohio Aviation Board's chief engineer, reported 10 of 90 aircraft accidents in Ohio in 1947 were caused by planes striking wires and that the number would be larger this year. Commission officials say case is without precedent, and question their authority to make such an order.**

**ATLANTIC HANGARS**—Atlantic Aviation is building two new hangars for its operations at Baltimore Municipal Airport and New Castle (Del.) County Airport, near Wilmington. New Castle hangar will take over most of the service and shop work on larger planes now being done at the Atlantic operation at Du Pont Airport, Wilmington. Baltimore base will provide enlarged facilities for the present operation of aircraft and radio sales and service. Hangars are 100 by 120 ft. with 10 ft. leantos on both sides.

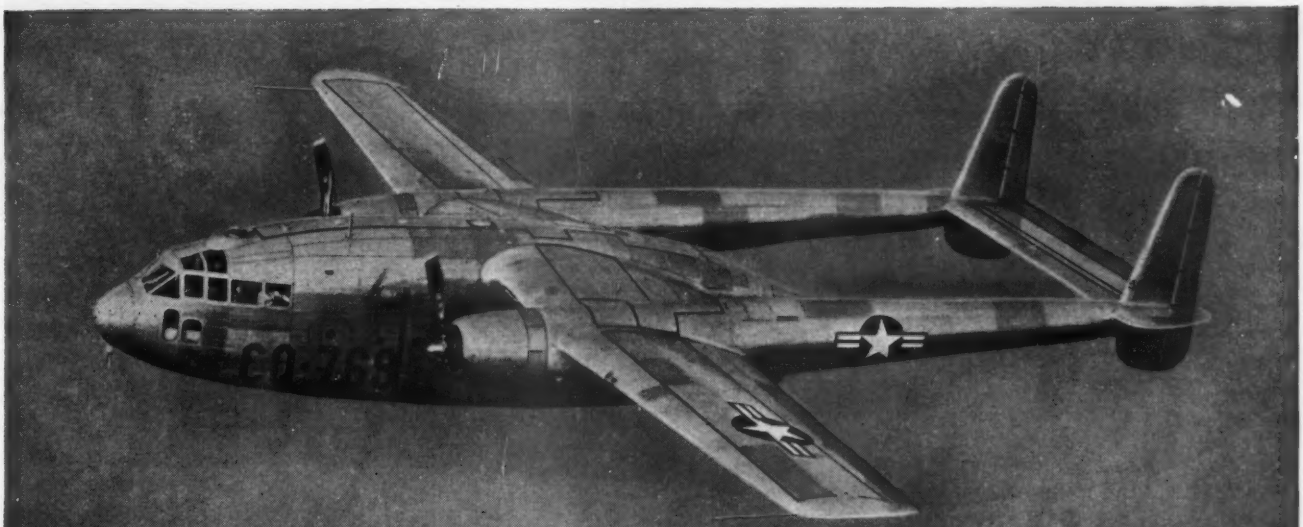
**STINSON MOVE?—Stinson dealers have been advised by the home office that possibility of a move of the Stinson division from Wayne, Mich., to San Diego, main home plant of Consolidated-Vultee, is again being considered. First plans to make the move a year ago were dropped but have been recently revived. A substantial stockpile of finished Voyagers and Flying Station Wagons in excess of present demands is available to cover sales during part of the non-productive period which the move would require. If the move is made, it is to be timed to begin 1949 model Stinson production at San Diego. Stockpile results from heavy production some months back as a precaution against a threatened strike which never took place.**

**RADIO UPTURN**—CAA study on the number of personal planes equipped with two-way radio, showed an important upturn in planes with radio factory installations in 1947 over 1946, despite the drop in total aircraft sold in 1947. Less than 9 percent of the 34,568 planes sold in 1946 were radio-equipped while 45 percent of the 15,338 planes sold in 1947 had factory radio installation. Total number of radio-equipped new planes in 1947 was 6908 as against only 3065 in 1946. CAA notes a steady growth in the number of all non-air carrier planes equipped with radio since 1945. Total number as of Dec. 31, 1947 was 18,159 as compared with only 11,573 at the end of 1946, and only 2783 at the end of 1945. Factors entering into this radio upturn include the increased proportion of four-place executive or family type planes which usually carry radios sold in 1947, and the sharp drop of two-place trainers usually sold minus radio.

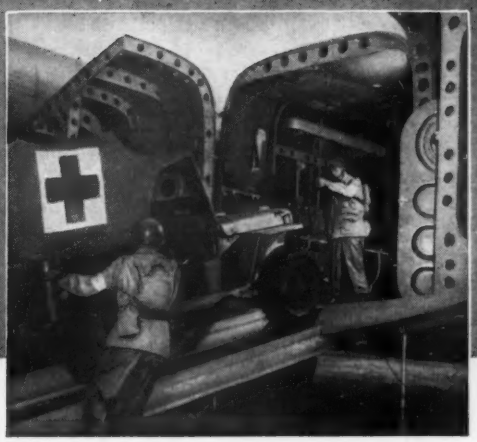
**AIRPORT MANAGEMENT—Discussion of many phases of airport operation—including merchandising, safety, pilot training, insurance, feeder lines, personal flying, rates and charges, leases and agreements, airport restaurants, is scheduled at the Texas A & M College's Airport Management Conference, at College Station, Texas, June 8-10. Speakers include leading national authorities.**

**OKLAHOMA AVIATION CLUBS**—Plans have been announced to form local aviation clubs in Oklahoma communities under leadership of the Oklahoma Aviation Association, with organization meetings in each of the 77 counties. A primary purpose of the new local groups is for construction of more airstrips throughout the state to provide greater utility for the airplane as an intra-state means of transportation. Clubs are being asked also to promote air age education, advise city officials on aviation needs of the community, cooperate with newspapers in disseminating aviation information, and take on special projects such as airmarking and providing better facilities in the community for the tourist private flyer. A report suggesting the club plan has been made to the state association by John Burke, Oklahoma city operator, and policy chairman of the association, and Jim Hough, assistant Oklahoma state aviation director, after a tour of the state to assess current conditions. They reported that a personal aviation slump, noted in the tour, was in large measure due to poor public relations between aviation groups and the general public, and urged this plan to promote improved understanding of aviation.

**FREE PAINT—New York State has offered free paint to the first 200 New York communities applying to participate in the state's 1948 air marking program. Applications are being received by the State Bureau of Aviation, Commerce Department, Albany, N. Y. With 100 markers already placed in the state, ultimate goal of 700 markers is sought. Emphasis is being placed on airmarking on the proposed Skyway 11, from Albany to Buffalo.**—ALEXANDER McSURELY



# Pattern for Swift Mobility



Speed is a prime essential in the modern concept of military maneuver. And speed, today, has to have wings.

In cooperation with the Air Forces and the Ground Forces, Fairchild research and engineering skill help provide those wings.

The rugged, hard-working C-82 Packet is now in service with the Troop Carrier Command as the standard transport for troops and guns, trucks and supplies. Its fitness for this important assignment was demonstrated in practical maneuvers such as Operation Yukon and Exercise Snowdrop.

Now, Fairchild engineering ingenuity has created the C-119—a new Packet that flies faster and farther and carries an even greater load.

In these two airplanes our military minds have found new answers to old problems, and around them have built a new pattern for swift mobility.

**Fairchild Aircraft**

*Division of Fairchild Engine and Airplane Corporation, Hagerstown, Maryland*

***Buenos Aires Letter:***

# Argentina Expands Air Industry

**Peron pushes stepped-up plane production and a new airport. FAMA plans Buenos Aires-New York run.**

The Argentine National Aircraft factory, Instituto Aerotechnico, at Cordoba, in northern Argentina, has begun a substantial expansion program.

Only concrete news of its expansion is the purchase of over $1,100,000 worth of machine tools which will be used in the military aircraft plant.

The order, one of the largest machine tool deals in Argentine history, is for 58 milling machines, Cincinnati type; 54 turret lathes, mostly British Herbert model; 11 radial drills; and various and sundry grinders, vertical lathes, gear hoppers and other equipment. They will be supplied by one U. S. firm and two British firms, with delivery to begin in three or four months.

All in all, it marks another step forward in President Juan Domingo Peron's plans not only to have the biggest air force in South America, but to make it independent of any outside suppliers.

His military aircraft plant since 1946 has turned out 650 Boyero 65-hp. trainers, 350 DL22 (AT-6 type) trainers, 35 Calquin light bombers and an unknown number of Pulque jet planes which use Rolls-Royce Derwent V jet engines. The plant has also made 35 Indio 600-hp. radial aircraft engines as well as a number of 450-hp. engines, showing that the work is progressing on much more than airframes.

The Argentine military aircraft industry has 20,000 skilled Italian aircraft and machine tool workers now employed in the aircraft plant and related industry. It will consume a good share of the funds allotted by the wealthy Argentine War Department to aviation.

The amount of this fund is not known, but the Secretariat de Aeronautica had a budgeted $38,000,000 last year, and, as is the custom with this department, probably spent double that.

This is in addition to military purchases, such as the $37,500,000 order given to the British for 100 Gloster Meteors and 30 Lincoln 4-engine bombers. Thirty jets and six bombers were delivered as of the first of the year, and probably a good share of the rest have been received by this time.

Turning to civilian aircraft, two big events are brewing for the Argentine aviation picture. One, FAMA, the Argentine international airline backed by the government, is expecting delivery on six Douglas DC-6s in the very near future, and upon receipt of these planes will open its new Buenos Aires-New York route. This will be Pan-American's first competition on this link with this type of machine.

The other event is the scheduled opening of "Argentina's Idlewild" in June. The airport, Ezeiza, is patterned directly on Idlewild. Argentine engineers studied Idlewild before beginning work. It is the favorite project of President Peron, and he has given orders, according to informed circles here, that this airport must be opened for service in June. That means it will be open in June—no matter what.

The $60,000,000 airport, moreover, is sufficiently finished so that jet planes have been using it for the past several months. Buildings are up, and installations are rapidly going in. Not all of the six runways will be finished, but at least two and perhaps more will be set to take in planes. The airport has one of the most beautiful locations in the world, and a six-lane superhighway connecting it with the city has been sufficiently finished to carry traffic.

The head of the aviation laboratories of the International Telephone and Telegraph Corp. of New York is now in Buenos Aires to take charge of installing the radio-electric system at Ezeiza. He is Col. Peter C. Sandretto, well-known U. S. engineer formerly with United Air Lines and the U. S. Air Forces.

His arrival points up the Argentine desire to have the best available talent and materials for the new airport. Over $2,000,000 has recently been spent by the Secretary of Aeronautics for radar and communication equipment. The ILS system conforms to U. S. standards. It is the Army's SCS-51.

Figures have been released on the past year's operation of the principal Argentine airlines. FAMA, the international airline and chosen instrument of the government, which incurred a substantial deficit for the year which has not yet been revealed, flew a total of 1,383,480 miles carrying only 2438 passengers. Its flights were to Rome, Madrid, Paris and London.

The line carrying the most passengers (of all the Argentine-owned lines) was ALFA, flying 499,857 total miles to Uruguay and Paraguay, and carrying 19,109 passengers (largely on the short hop to Montevideo). ZONDA, flying to Bolivia and Chile, carried 14,307 passengers while flying 912,136 miles. The line carrying the fewest passengers of the internal lines was LADE whose experimental routes carried 3563 while flying 223,562 miles.

## Three-Way Transport

General Aircraft Ltd. will turn out its first Universal transport within a year's time.

Powered by four Bristol Hercules 261 air-cooled radial engines, the forty-ton plane offers full freight, full passenger, or combination freight and passenger accommodations.

Fitted out as an airliner, the Universal will seat 90 passengers. As a cargo-passenger airliner, it will seat 30 passengers on an upper deck leaving space for about 20,280 lb. of freight for a 500-mile run. Maximum payload is 25,380 lb. or 25 percent of the gross weight. For 1000-mile stages, payload is 15,750 lb. or about 16 percent of the gross weight.

Calculations indicate that the Universal will have a top speed of 240 mph., with cruising speed ranging from 150-200 mph. Fully loaded the plane will be airborne in 1650 ft. and will be able to clear an obstacle 50 ft. high in 2580 ft.

## Streamlined Bookings

Direct cable installation between New York and London is part of British Overseas Airways Corp.'s streamlined ground communication program.

This, together with teletype networks and special telegraph and telephone connections to BOAC's offices in North America and other parts of the world, makes it possible for a booking involving travel across several continents to be confirmed within a few hours.

Other innovations include teleprinter service to key hotels and consulates throughout the United States and a telephone "office" in Philadelphia. The latter is the initial step toward establishing more of these facilities in principal U. S. cities. Through an arrangement with the Bell Telephone System, anyone calling the BOAC "local" phone number in Philadelphia is connected with the airline's reservation desk in New York gratis.

# FINANCIAL

## Cal-Eastern Files Bankruptcy Plea

**Carrier plans reorganization to attract new funds. Program hinges on CAB decision in airfreight case.**

California Eastern Airlines, one of the major noncertificated air cargo carriers, has been forced to seek financial relief by filing an action in bankruptcy in the U. S. District Court at Wilmington, Del.

This was done under Chapter XI of the Bankruptcy Act which permits the rearrangement of a company's financial affairs without appointment of a trustee. A reorganization is being attempted in an effort to attract new funds to the company.

▶**Convertible "A" Stock**—California-Eastern now has 1,112,000 shares of common stock outstanding. The company proposes to offer common stockholders the right to subscribe to a new Class A, of which there would be 500,000 shares. The "A" stock would have a $5 par value, be entitled to a 5 percent annual dividend and be convertible into five shares of common at any time.

New preferred stock would also be issued. The exact amount of this issue is not presently indicated. However, it would have a $1 par value and be entitled to a 5 percent dividend prior to the Class "A" and common stocks. Voting power would be placed with the "A" and common stocks.

It appears that it is the hope of the company to have its creditors accept this new preferred stock in payment of their claims.

▶**Hinges on CAB Decision**—This entire financing program virtually hinges on the forthcoming decision of CAB in the airfreight case. A Board examiner previously has recommended that California Eastern and a few other cargo carriers be authorized to conduct regular cargo operations.

It was the hope of California Eastern and most of the other cargo lines to survive in the anticipation of a favorable Board decision which would then facilitate badly needed financing.

Presumably, California Eastern could not hold out any longer and was forced to place itself under the protection of the Bankruptcy Act.

▶**A Surprise**—The California Eastern action, nevertheless, came somewhat as a surprise despite the known fact that it was experiencing substantial losses. Some observers believed that it had strong banking support which would come to the rescue at the crucial point. Evidently, this was not the case.

It is known that individual members of Lehman Brothers, investment banking firm, were very much interested in California Eastern. Of the original 150,000 shares of stock issued by this company, it is reliably reported that members or friends of Lehman Brothers purchased more than one-half of the issue at around $1.00 a share.

▶**Merged With Mercury**—California Eastern was incorporated in the State of Delaware on Jan. 14, 1946, and commenced actual operations as a contract carrier in May, 1946. The company was merged with Mercury Transport Corp. in September, 1946. The latter was a paper corporation which had filed an application with CAB in May, 1946. This application was considered Mercury's major if not its only asset. In return for this asset, Mercury received California Eastern stock having a par value of $52,000. The promotors of Mercury then became dominant factors in California Eastern and have been primarily responsible for its operations until a short period ago after virtually all financial resources had been exhausted.

At the time of the airfreight case hearing, Andre de St. Phalle and Co. of New York agreed to undertake for interim financing the private sale of an additional 495,000 shares of the presently authorized stock. It also was stated for the record that public financing in the event of certification would be undertaken by the same investment firm.

▶**Lehman Brothers Partner Helps**—In the current attempt at rearranging the the company's finances, a partner of Lehman Brothers is taking an active part in working out the details through other investment houses. Among other reasons, the financing involved is believed too small for Lehman Brothers.

The fact remains that without a favorable CAB decision in the currently awaited airfreight case, there will be little likelihood of the cargo company's attempting the contemplated financing at this time. A new approach to untangle the affairs of California Eastern might be found necessary. Certainly, its continued existence under those circumstances would be seriously in doubt.

▶**Slick Merger Fell Through**—Late last year, there was a move to merge California Eastern with Slick Airways. While this combine was on the verge of being completed, it fell through at the last moment. Some observers indicated that California Eastern was unable to raise the additional cash that Slick felt should be placed in the company before the merger. The discussion of this merger, in any event, had the effect of creating considerable activity in California Eastern's stock, and it hit a peak of around $1.37 per share.

The prospect of receiving shares of a combined company having the financial support of Slick Airways was considered very attractive. As this merger appeared less likely, California Eastern's shares reflected this through a gradual decline in market quotations. The filing of the bankruptcy action placed the shares at a nominal bid of 15 cents per share.

The interest of members of Lehman Brothers is reflected in all phases of the aviation industry and is evidently prompted by the desire not to overlook any promising development that may afford future promise.

▶**Sells Shares**—In March, 1947, Air Express International Agency, Inc., publicly sold 125,000 shares of common stock at $6.00 per share. At that time, it was revealed that a partner in Lehman Brothers owned 29,800 shares of stock in this international airfreight forwarder. Earnings of the company have been slow in materializing, however, and the company's equity is now quoted around $2.00 per share.

Lehman Brothers is also interested in a number of certificated airlines. The firm has taken an active part in a number of major pieces of airline financing. Partners of the firm are represented on the board of directors of National, Continental Airlines, and Pan American Airways.

▶**Lehman Corp. Holdings**—The Lehman Corp., investment trust, managed by the banking firm, maintains substantial commitments in a number of airline equities. The bulk of such investments appears to have been made at prices materially higher than current market quotations. Such holdings are: 36,000 American Airlines, 18,750 American Overseas Airlines, 10,000 Eastern, 6500 Pan American Airways and 29,000 United Airlines.

It is not always a simple matter to evaluate correctly and profitable trends in the aviation industry.

—Selig Altschul

**DOMESTIC AIRLINE TRAFFIC**

Comparison of First Quarter 1947 and 1948

| Carrier | First Quarter 1948 Rev. Pass. | First Quarter 1948 Rev. Pass. Miles | First Quarter 1947 Rev. Pass. | First Quarter 1947 Rev. Pass. Miles |
|---|---|---|---|---|
| American | 462,591 | 224,520,000 | 531,012 | 275,695,000 |
| Braniff | 112,491 | 39,965,000 | 124,298 | 44,124,000 |
| Capital | 187,264 | 48,500,000 | 201,320 | 50,462,000 |
| Chicago & So. | 53,024 | 21,376,000 | 58,772 | 23,198,000 |
| Colonial | 23,604 | 6,687,000 | 22,674 | 6,539,000 |
| Continental | 30,842 | 11,275,000 | 36,387 | 12,053,000 |
| Delta | 99,018 | 43,791,000 | 107,191 | 51,667,000 |
| Eastern | 466,251 | 275,741,000 | 383,114 | 230,987,000 |
| Inland | 15,366 | 5,598,000 | 16,564 | 4,420,000 |
| Mid-Continent | 60,968 | 18,233,000 | 53,120 | 16,416,000 |
| National | 30,203 | 16,196,000 | 78,705 | 47,181,000 |
| Northeast | 48,594 | 8,943,000 | 67,463 | 12,697,000 |
| Northwest | 110,569 | 57,234,000 | 127,311 | 63,492,000 |
| TWA | 234,921 | 183,271,000 | 181,873 | 138,838,000 |
| United | 331,864 | 190,712,000 | 354,948 | 217,551,000 |
| Western | 62,290 | 24,087,000 | 101,338 | 38,735,000 |
| Totals | 2,329,860 | 1,176,129,000 | 2,446,090 | 1,234,055,000 |

# Traffic Down on Domestic Airlines

## First quarter 1948 reports indicate passenger miles for 16 trunklines dropped five percent below 1947.

Domestic airline traffic was in the doldrums during the first quarter of 1948.

The 16 trunklines did five percent less passenger business in the first three months of this year than in the same 1947 period. Only five of the 16 carriers flew more revenue passenger miles in first quarter 1948 than in first quarter 1947.

▶**Comparison Made**—Revenue passengers flown by the trunklines totaled 2,329,860 from January through March of this year compared with 2,466,090 in the same three months of 1947. Revenue passenger miles aggregated 1,176,129,000 against 1,234,055,000 in the first quarter last year.

Two of the "Big Five" trunklines—Eastern and TWA—have reported substantial gains in passenger traffic thus far in 1948. The other three—United, American and Northwest—were well below 1947 levels.

▶**Other Gains**—Smaller carriers reporting increases in revenue passenger mileage were Colonial, Inland and Mid-Continent.

Major factor in Eastern's spectacular growth from 230,987,000 revenue passenger miles in first quarter 1947 to 275,741,000 in the same period this year was the National Airlines pilot strike which started Feb. 3. EAL had a virtual monopoly on New York to Florida business during the height of southbound vacation travel.

▶**American Topped**—Indicative of the sharp spurt in Eastern's traffic is the fact that in the first quarter it handled more passengers domestically than American or any other carrier. EAL flew 466,251 revenue passengers during the first three months of this year, compared with 462,591 for American, 331,864 for United and 234,921 for TWA. In first quarter 1947, American flew 531,012 passengers against 383,114 for Eastern.

With the NAL pilot walkout now approaching its fourth month, Eastern's prospects for a bonanza second quarter are excellent. National did not restore service to every city on its system until May 15. It is now flying 98 percent of the available seat miles operated prior to the pilot strike.

▶**Strike Results**—But NAL is still suffering from the walkout. In February, the carrier flew only 1,907,000 revenue passenger miles compared to 15,108,000 in the same month last year. In March the total rose to 3,931,000 revenue passenger miles, still far below the 17,758,000 registered in March, 1947. NAL's April and May traffic probably will remain well under last year's levels.

TWA's favorable showing in first quarter 1948 came at a time when two of its transcontinental competitors—American and United—were still handicapped by the DC-6 grounding. In the first three months of this year, TWA flew 183,271,000 revenue passenger miles compared with 138,838,000 in the same 1947 period.

▶**Prospects Bright**—Prospects that overall domestic trunkline passenger traffic in second quarter 1948 will exceed that reported in the same 1947 months are good. Business showed a substantial seasonal upturn during the latter part of April and early May. Last year, second quarter traffic was affected by a severe slump in June—the result of three highly publicized DC-4 accidents.

# TACA Finances Look Up; Deficit Pared

TACA Airways, S.A., continued to operate in the red during 1947 despite the guiding hand of Waterman Steamship Corp. But stringent economies and elimination of unprofitable services pared the deficit sharply.

With expenses trimmed from $7,679,000 in 1946 to $5,608,000 last year, TACA's net loss dropped from $7,920,406 to $2,209,740. Revenues were $3,157,000 in 1947 compared to $3,553,000 in 1946.

▶**Cloudy Future**—Paul E. Richter, who was named TACA's president and board chairman by Waterman interests last September, believes present unsettled conditions not only in Central America but in the world make accurate predictions of future earnings impossible. He said his company's program of streamlining and condensing services in and to Latin America will be continued.

Nearly $500,000 of TACA's net income last year came from a steamship chartering arrangement with Waterman which is still in effect. (AVIATION WEEK, Mar. 15). Manned by Waterman crews, the chartered cargo vessels are not used in Central American trade but operate to Europe and the Far East. All profits apparently go to TACA Airways Agency, a subsidiary.

▶**Retrenchment Moves**—Due to heavy cash losses being experienced in operations between Miami and San Salvador, El Salvador, via Havana and Belize, British Honduras, TACA indefinitely suspended service on this link Feb. 28 of this year. At the same time, TACA negotiated an agreement with Honduran and Nicaraguan nationals to sell its subsidiaries in those two countries.

# Airline Financing Legislation

**Two bills before House will facilitate purchase of equipment by carriers. Early enactment possible.**

Legislation clearing away legal impediments to certain types of airline financing may be enacted before Congress adjourns.

Non-controversial nature of two bills to facilitate purchase of equipment by cash-short carriers was illustrated by the unanimous backing given them by government, manufacturing, banking and airline witnesses testifying before the House Interstate and Foreign Commerce Committee. Recommended by the Congressional Aviation Policy Board, the measures were introduced in the House by Reps. Wolverton (R., N. J.) and Stefan (R., Neb.).

▶**Testimony Given**—Witnesses before the House group were: Air Transport Association's executive vice president, Robert Ramspeck; G. Nathan Calkins, Jr., CAB; Warren S. Ege, Aircraft Industries Association; and Roger F. Murray, vice president, Bankers Trust Company of New York.

One measure would give airlines greater latitude in equipment purchases by authorizing the recordation of liens on engines and spare parts, as well as aircraft. By giving legal status to liens on engines and spares, federal recordation (by CAA) would substantially ease the cash requirements for new fleet purchases—$4,000,000 on a $20,000,000 purchase.

▶**Case Cited**—"Often the spare engines and parts amount to 25 percent of the total purchase price," Ramspeck explained. "Thus, if a new airplane cost $1,000,000, the spare parts and engines would cost an additional $250,000. The airline could borrow about 80 percent of the purchase price of the new aircraft and give an acceptable lien on the aircraft because under the 1938 CAA Act, the Administrator will record liens on aircraft. But the Act does not provide for the recordation of liens on aircraft engines or spare parts, so the airlines are restricted in the type of financing available to purchase such equipment.

"Because of this, the airline would need to raise $250,000 for the spare parts, as well as the $200,000 payment on the purchase price for the airplane, or about 36 percent of the purchase price of the new equipment. In contrast, if a lien could be given on the total purchase, the airline would have to pay only about 20 percent cash, or $250,000."

▶**Vicious Circle**—Ramspeck, as well as the committee's other three witnesses, highlighted the current vicious circle in airline financing. Forced to operate outmoded and uneconomic equipment, the carriers are hampered in improving their financial status to the point where they could purchase the most modern and efficient equipment.

The second measure before Congress opens the way for secured financing of the equipment trust and conditional-sale types by removing the liability of the security owner in the event of an aircraft accident. At present, approximately a dozen state laws make the security owner of a plan subject to absolute liability for damages—a situation which has virtually forbidden equipment trust airline financing.

▶**Foreign Problem**—CAB representative Calkins pointed out that the difficulty of international carriers in obtaining secured financing, when unsecured financing fails to meet demands, is further increased because numerous foreign countries do not recognize the rights of mortgagees. Thus, Calkins observed, financial institutions are reluctant to give mortgage-type financing.

If an airline financier uses the lien-type mortgage, he runs the risk that his lien will not be recognized if the aircraft is attached aboard, and if he adopts the equipment trust, conditional sale, or other title-retention method of financing, there is the possibility that he will be held absolutely liable domestically for damage to persons or property under state laws.

▶**Caution Urged**—The only reluctant note at the hearing was struck by banker Murray. He took the position that secured airline financing is "unhealthy" and should be discouraged. He endorsed both bills, however, with the explanation that the way should be cleared for secured financing for the exceptional instance in which it is the only recourse and is necessary to give an airline adequate equipment for services, as well as to sustain an aircraft manufacturer.

Pointing to increased airline borrowing as "an unfavorable development," Murray observed: "Either debenture bonds sold to the public or unsecured term loans with proper protective provisions provide much greater flexibility in the financing of new flight equipment than any form of secured loan. Nevertheless, we believe that it is most important that the necessary legislative action be taken to facilitate the financing of flight equipment acquisition on a secured basis." It should be recognized, he warned, that "the facilitating of secured loans will not . . . encourage banks . . . to make loans which are not justified by the soundness and profitability of the operation."

**Problems Discussed at Meeting of Chief Pilots**

**Emphasis on utilization of Instrument Landing System facilities marked the recent chief pilots' meeting in Washington called by the Air Transport Association. With operational experience increasing, the pilots discussed problems arising through use of ILS and explored the possibility of new rules. Other items on the agenda of the three-day meeting included a review of Air Traffic Control procedures, discussions on pressurized aircraft, an open forum, and subjects of interest to chief pilots. Shown at the session in the Wardman Park Hotel are, left to right, E. L. Lowe, chief pilot, Florida Airways; Carl F. Luethi, system chief pilot, Northwest Airlines; H. J. Reid, manager of flight operations, Capital Airlines; Milton W. Arnold, vice president-operations and engineering, ATA; H. F. Hershey, representing the director of flight operations, Chicago & Southern Air Lines; Tom L. Boyd, assistant director of flight, American Airlines; John F. Gill, chief pilot-eastern region, Eastern Air Lines.**

# Mail Pay Too High?

**House committee says yes; calls for separation of subsidy and service cost.**

A tougher attitude toward airline subsidization has been urged on Congress by the House Post Office and Civil Service Committee.

Stating that the present method of distributing airmail payments has been subject to numerous abuses, Rep. Edward Rees (R., Kans.), chairman of the group, has called for separation of the subsidy element from service rates. He said the Post Office Department should no longer be an unlimited source of funds which can be drawn upon at will by the Civil Aeronautics Board to carry out expensive experiments in the airline pattern.

▶ **Hearings Held**—The committee's report was made following extensive hearings at which testimony was received from representatives of the Post Office, CAB, the Air Transport Association and the certificated airlines. Major problem faced by the House group is how to reduce the mounting Post Office Department deficit, which will aggregate about $375,000,000 this year.

Post Office officials estimated the airlines are receiving between $15,000,000 and $17,000,000 annually in subsidies. In fiscal 1947, Post Office expenditures for handling foreign and domestic airmail exceeded revenues by $30,342,000.

▶ **Congressional Scrutiny** – "Such subsidies as are necessary to carry out our air transportation policies should be made pursuant to direct appropriations and subject to the scrutiny of the appropriations committees of Congress," Rees declared. This move would be in conformity with changes made in 1936 when merchant marine subsidies were separated from postal funds and were paid out of specific appropriations.

Rees said one of the extravagant Post Office Department policies which was the basis for his committee's conclusion is the feederline program. He asserted that a high percentage of mail carried by the feeders could be handled by trunklines at a much reduced cost.

▶ **Comparison Made** – The report pointed to the huge difference in mail pay received by Braniff Airways and Pioneer Air Lines for service in the same area. Braniff, in the first nine months of 1947, received $325,247 for flying 543,978 mail ton miles, while Pioneer received $752,153 for 26,669 mail ton miles. "In other words, Pioneer received more than twice as much money for carrying one-twentieth as much mail."

Southwest Airways, the committee continued, was paid $1,893,658 for flying 45,031 mail ton miles between Dec. 2, 1946, and Mar. 31, 1948. "In comparison, a service-rate carrier would have transported 4,200,000 ton miles for the same amount of money."

▶ **High Salaries**—Rees found little relationship between salaries paid officers of the airlines and the size of their operation. He cited the example of a carrier paying $50,000 in officers' salaries during a recent year while operating only two planes. At the same time, 30 percent of the company's operating revenue was derived from mail pay.

"Under CAB's policy of granting airmail pay on the basis of need rather than services performed, the Post Office has been called on to pay excessive costs," the report declared. "Factors in these high costs are (besides high officers' salaries) stock warrants and options given to officers and losses from poor management and over-expansion. Recent CAB actions point toward an even greater diversion of postal funds to make up for the bad guesses of the airlines and the board."

# Cal Eastern and U. S. Airlines in the News

Resumption of service by U. S. Airlines, and California Eastern Airways' action in filing proceedings in U. S. District Court under the bankruptcy act, highlighted recent developments among independent airfreighters (page 39).

U. S., formerly based at St. Petersburg, Fla., suspended operations late last fall. The carrier has now shifted its headquarters to Atlanta, Ga., and is slated to fly from New York and Detroit to Atlanta, New Orleans and Miami with three C-47s. Plans are under way to lease five C-46s from the Army.

**Adams Sworn In**

**When Russell B. Adams (right) took the oath of office this month, the Civil Aeronautics Board once again had its full complement of five members. Former director of the Board's Economic Bureau, Adams replaced Harllee Branch, who retired May 1. He is shown being sworn in by Postmaster General Jesse M. Donaldson.**

▶ **CEA's Finances**—California Eastern, which flew over 11 million ton miles in 1947 and was third in the cargo field behind Slick and American Airlines, seeks rearrangement of its financial affairs without appointment of a trustee. If stockholders approve, the company plans to issue new preferred stock: CEA operates transcontinentally with C-54s.

Meanwhile, Slick has announced belief that a workable tariff can be constructed around the minimum freight rates proposed by CAB in April (AVIATION WEEK, May 3) if the Board also approves special specific commodity rates outside the formula. Slick expects the new rate floor to become effective July 1 or earlier.

# REA To Resume Air Express Abroad

Railway Express Agency is trying to regain some of the foreign business it lost last March when seven overseas airlines failed to renew their REA contracts covering international service (AVIATION WEEK, Mar. 1).

Resumption of REA's air express service to Europe, Asia and Africa is to be accomplished through a joint arrangement with Colonial Airlines. Colonial will fly shipments to Bermuda and will reforward them to connecting international carriers for movement to their destination.

▶ **Canceled Agreements**—Carriers which canceled international cargo agreements with Railway Express Agency Mar. 1 were Pan American Airways, American Overseas Airlines, Braniff Airways, Northwest Airlines, Eastern Air Lines, Linea Aeropostal Venezolana and Philippine Air Lines. Overseas service continued over Australian National Airways, Chicago & Southern Air Lines, Peruvian International Airways, TACA Airways and Colonial.

Meanwhile, REA last week was slated to place new and lower surface rates on shipments of retail merchandise from New York City to 23 West Coast points.

## Nonsked Agent

Formation of a new company, Sky Coach Ltd., to serve as a reservations and booking agency for nonscheduled passenger airlines has been announced by its president, Edward Ware Tabor. Main offices are in Hotel Lincoln, New York. Tabor, who also heads Trans-Atlantic Airways, which offers $99 coast-to-coast DC-4 fares (AVIATION WEEK, Mar. 15), stated that at the outset the new concern's principal activity will be to handle sales for TAA. During the past year, TAA has flown 50,000,000 passenger miles on its transcontinental and Puerto Rican routes.

**Airlines and Military Air Transport Service Test New Hydraulic Cargo Loader**

**Development of a new hydraulic cargo loader, to simplify and expedite handling of heavy airfreight items has been announced by A. Cresci & Son, Inc., Vineland, N. J. Capable of handling a 14,800-lb. load, the device is receiving close study by both the commercial airlines and the armed forces. The newly organized Military Air Transport Service has asked Wright Field to procure five loaders for testing at several bases. Left, loading of an American DC-4; right, device fully raised.**

# 309 Big Airports In Fiscal 1949 CAA Plan

Airport expenditures of more than $100,000,000 in federal and matching local sponsor funds are proposed in a CAA recommendation forwarded to Congress for Class IV and larger airports in fiscal year 1949. CAA lists 309 projects calling for expenditure of $52,576,455 in federal funds in addition to funds to be provided by municipalities, counties and states. Of the projects, 153 calling for $24,965,290 in federal funds are being resubmitted for Congressional approval.

Airport projects and their total proposed expenditures:

**Alabama**—Birmingham, $267,000; Gadsden, $69,000.

**Arizona**—Ajo, $20,000; Coolidge Florence, $15,000; Douglas Bisbee, $26,424; Kingman, $25,000; Marana, $9,600; Nogales International, $60,000; Phoenix Sky Harbor, $2,527,922; Prescott Love Airport, $83,746; Tucson Municipal No. 2, $85,879; Yuma, $60,000.

**Arkansas**—Blytheville, $40,000; El Dorado, $20,000; Ft. Smith, $354,000; Hope, $30,000; Little Rock, $241,200; Newport, $16,000; Stuttgart, $65,550; Texarkana, $259,162; Walnut Ridge, $20,000.

**California**—Banning, $32,724; Bishop, $2,709; Concord Buchanan, $225,794; Del Norte County, $20,018; Fresno Hammer, $98,000; Hawthorne, $119,000; Hayward, $109,247; Little River, $7,497; Long Beach, $40,000; Los Angeles, $2,691,805; Marysville-Yuba County, $14,550; Monterey Peninsula, $224,336; Montague-Siskiyou County, $9,247; Napa County, $27,742; Oakland, $712,040; Ontario International, $18,494; Oxnard, $40,889; Palmdale, $269,247; Porterville, $14,553; Redding, $25,000; Sacramento, $565,858; San Bernardino Morrow, $339,117; San Diego Miramar, $253,000; San Diego Lindbergh, $1,008,600; San Francisco, $3,408,159; Santa Monica, $236,558; Santa Rosa Sonoma County, $71,342; Torrance, $6,000; Visalia, $38,400.

**Colorado**—Colorado Springs Peterson, $50,000; Denver Stapleton, $575,588; La Junta, $19,200; Pueblo, $50,000; Rocky Ford, $19,200.

**Connecticut**—Hartford Brainard, $606,505; New Haven, $396,000; Windsor Locks, $150,000.

**Delaware**—New Castle, $277,600.

**Florida**—Daytona, $575,000; Ft. Lauderdale, $70,750; Lakeland Drane, $55,000; Miami International, $850,000; Orlando, $150,000; St. Petersburg-Pinellas County, $220,000; Tallahassee Dale Mabry, $200,000; Tampa Drew, $270,000.

**Georgia**—Atlanta, $1,170,900; Augusta Bush, $971,278, La Grange Calloway, $82,000; Macon Herbert Smart, $196,500; Tifton, $50,000.

**Idaho**—Boise, $150,000; Coeur D'Alene, $26,643; Lewiston-Nez Perce, $178,900.

**Illinois**—Champaign-Urbana, $100,000; Chicago Municipal, $1,000,000; Chicago Douglas, $12,300,000; Decatur, $100,000; Peoria, $36,000; Quincy, $38,000; Springfield, $100,000.

**Indiana**—Evansville Memorial, $240,000; Ft. Wayne-Baer, $100,000; Indianapolis Weir Cook, $867,000; Richmond, $200,000; Seymour Freeman, $40,000; South Bend Bendix, $560,000; Terre Haute Holman, $100,000.

**Iowa**—Burlington, $280,000; Des Moines, $400,000; Dubuque, $100,000; Waterloo, $150,000.

**Kansas**—Coffeyville McGugin, $10,000; Dodge City, $10,000; Garden City, $10,000; Great Bend, $10,000; Hutchinson, $150,000; Independence, $10,000; Kansas City Fairfax, $100,000; Liberal, $17,550; Newton Wirt, $33,912; Pratt, $10,000; Topeka Billiard, $892,950; Wichita, $257,500; Winfield-Arkansas City, $10,000.

**Kentucky**—Covington, $130,000; Louisville Standiford, $550,000.

**Louisiana** — Alexandria, $33,500; Baton Rouge-Harding, $225,000; Houma, $104,000; Lafayette, $36,540; Mansfield DeSoto, $52,650; New Orleans-Callender, $52,450; New Orleans Moisant, $1,154,278; Shreveport Municipal No. 2, $1,185,814.

**Maine**—Millinocket, $5,350.

**Maryland**—Baltimore Friendship, $1,015,000.

**Massachusetts**—Bedford Hanscom, $530,000; Boston Logan, $1,600,000; New Bedford, $60,000; Worcester, $1,072,000.

**Michigan**—Battle Creek Kellogg, $90,000; Detroit City, $180,000; Detroit-Wayne Major, $2,856,548; Flint Bishop, $110,000; Grand Rapids Kent County, $470,000; Lansing Capital City, $104,000; Muskegon County, $320,000.

**Minnesota** — Alexandria, $26,000; Bemidji, $75,900; Duluth William Johnson, $200,000; Minneapolis-St. Paul Wold-Chamberlain, $1,250,000; Rochester, $350,000.

**Mississippi** — Grenada, $25,000; Gulfport, $14,000; Jackson, Jackson Hawkins, $654,000; Laurel, $26,000; Sheridan Key, $108,500; Natchez, $54,350.

**Missouri**—Kansas City Grandview, $540,000; Malden, $10,000; St. Louis Lambert, $2,735,126; Springfield, $10,000; St. Joseph Rosecrans, $50,000.

**Montana**—Billings, $90,000; Cut Bank, $87,560; Glasgow-Valley County, $30,000; Great Falls, $40,000; Helena, $719,350; Lewiston, $10,000; Miles City, $19,785; Missoula County, $40,000.

**Nebraska**—Norfolk, $50,000; North Platte, $98,000; Omaha, $1,270,000; Scribner State, $20,000.

**Nevada**—Boulder City, $4,800; Elko, $2,500; Las Vegas-Clark County, $603,750.

**New York**—Albany, $1,120,000; Binghampton-Broome County, $1,250,000; Buffalo, $805,000; Islip-Macarthur, $83,000; New York Idlewild, $1,400,000; New York LaGuardia, $3,870,000; Plattsburgh, $80,000; Rochester, $1,485,000; Schenectady County, $62,000; Syracuse-Hancock, $244,000.

**New Hampshire**—Berlin, $81,700; Portsmouth, $82,620.

**New Jersey**—Atlantic City, $100,000; Newark, $2,425,000.

**New Mexico**—Albuquerque Kirtland, $175,840; Artesia, $26,376; Deming, $6,000; Las Vegas, $105,504; Roswell, $281,343; Santa Fe, $69,000.

**North Carolina**—Charlotte, $48,000; Greensboro-High Point, $404,600; Lumberton, $124,000; New Bern-Simmons Knott, $156,300; Wilmington-New Hanover County, $160,000; Winston-Salem Smith Reynolds, $77,702.

**North Dakota**—Bismarck, $133,000; Dickenson, $30,000; Fargo-Hector, $285,000; Grand Forks, $72,650; Jamestown, $124,000; Minot, $186,000.

**Ohio** — Akron-Canton, $80,000; Cleveland, $1,720,000; Columbus, $850,000; Dayton-Vadalia, $100,000; Springfield, $250,000; Youngstown, $669,000; Zanesville, $120,000; Toledo Glendale, $380,000

**Oklahoma**—Ada, $41,100; Altus New Municipal, $71,300; Cushing, $80,000; Durant-Esker, $34,500; Enid Woodring, $38,915; Frederick New Municipal, $69,000; Gage, $46,000; Hobart New Municipal, $25,000; Muskogee Davis, $100,000; Norman Max Westheimer, $46,000; Oklahoma City Will Rogers, $440,000; Perry, $35,000; Ponca City, $147,529; Stillwater Searcy, $80,000; Tulsa, $130,000; Woodward New Municipal, $100,000.

**Oregon**—Astoria, $25,700; Corvallis, $39,300; The Dalles, $24,300; Denmark Port Oxford, $33,032; Eugene, $71,500; Klamath Falls, $178,908; McMinnville, $114,782; Medford, $175,000; Newport, $38,300; North Bend, $36,200; Portland, 411,163; Pendleton, $31,300; Redmond, $26,800; Salem McNary, $167,328; Troutdale, $74,740.

**Pennsylvania**—Philadelphia Southwest, $2,305,000; Greater Pittsburgh, $2,305,000; Erie, $286,220; Wilkes Barre-Scranton, $105,000.

**Rhode Island**—Providence T. F. Greene, $230,000.

**South Carolina**—Charleston, $64,000; Columbia Capitol, $250,000; Greenwood, $163,000.

**South Dakota**—Aberdeen, $209,500; Mitchell, $20,000; Pierre, $20,000; Sioux Falls, $20,000; Watertown, $107,547.

**Tennessee** — Bristol Tri-Cities, $134,432; Chattanooga Lovell, $1,162,000; Knoxville McGhee-Tyson, $281,600; Memphis, $1,250,000; Nashville Berry, $950,000.

**Texas** — Abilene, $60,000; Alice, $244,400; Amarillo English, $1,050,000; Austin Mueller, $200,000; Beaumont Jefferson County, $75,000; Big Spring, $30,000; Brownsville International, $340,000; Brownwood, $120,000; College Station Easterwood, $114,600; Corpus Christi Maus, $414,912; Dallas Love, $240,000; Del Rio-Val Verde County, $60,000; El Paso Anderson, $200,000; Lubbock, $300,000; Greater Ft. Worth International, $1,700,000; Galveston, $119,000; Greenville Majors, $41,200; Harlingen All Valley, $50,000; Houston, $600,000; Laredo, $50,000; Palacias, $40,480; San Angelo Concho, $100,000; San Antonio Municipal, $709,500; Sweetwater Avenger, $20,000; San Antonio Stinson, $111,389; Temple Draughton-Miller, $38,000; Tyler Pounds, $67,500; Van Horn-

Culberson County, $44,000; Waco Blackland, $122,000; Wichita Falls Kell, $300,000.

**Utah**—Delta, $16,483; Logan-Cache County, $70,592; Ogden Hinckley $404,400; Provo, $81,106; Salt Lake City Municipal No. 1, $202,200.

**Vermont**—Burlington, $308,000.

**Virginia**—Richmond Byrd, $820,000; Norfolk, $550,000; Danville, $125,000.

**Washington** — Aberdeen-Hoquiam, $58,000; Bellingham, $124,000; Ellensburg Bowers, $58,000; Everett Paine, $85,000; Olympia, $42,000; Renton, $52,000; Seattle Boeing, $100,000; Seattle-Tacoma, $980,000; Yakima, $300,000.

**West Virginia** — Wheeling-Ohio County, $205,000; Charleston Kanawha, $900,000.

**Wisconsin**—Oshkosh, $160,000; La Crosse, $100,000; Madison Truax, $60,000; Milwaukee Mitchell, $1,783,000.

**Wyoming** — Cheyenne, $120,000; Sheridan, $173,200; Rock Springs, $53,366.

**Puerto Rico**—San Juan International $2,100,000.

# Shannon Crash

**No evidence of ILS trouble or mechanical failure turned up in hearing on fatal crash.**

Statements and documentary evidence from CAB examiners and Pan American Airways officials eliminated the possibility of an inoperative ILS system as cause for the Pan American Constellation crash at Shannon, Eire, on April 15.

Testifying before a CAB hearing in New York on the accident, both S. Miller Logan, PAA maintenance supervisor, and J. D. O'Neal, assistant chief pilot for PAA training, stated that their company is satisfied that the Shannon ILS installation "was completely operative at the time of the crash".

▶ **No Engine Malfunction**—Previously, R. D. Cassell, air safety investigator for CAB's safety bureau, had stated that no evidence was seen which proved malfunction of the aircraft's powerplant, electrical system, or control system, prior to impact.

Reporting on the pilots of the aircraft, O'Neal stated that he had flown check flights with Captain Frank C. Jakel, pilot, and would class him as an "average" pilot. Carlton N. Henson, first officer of the ill-fated craft, however, was to have been assigned to the airline's training section upon completion of the flight, because of a previous unsatisfactory report on him. Henson had received his unsatisfactory report on his instrument flying for getting lost over Shannon at 500 ft.

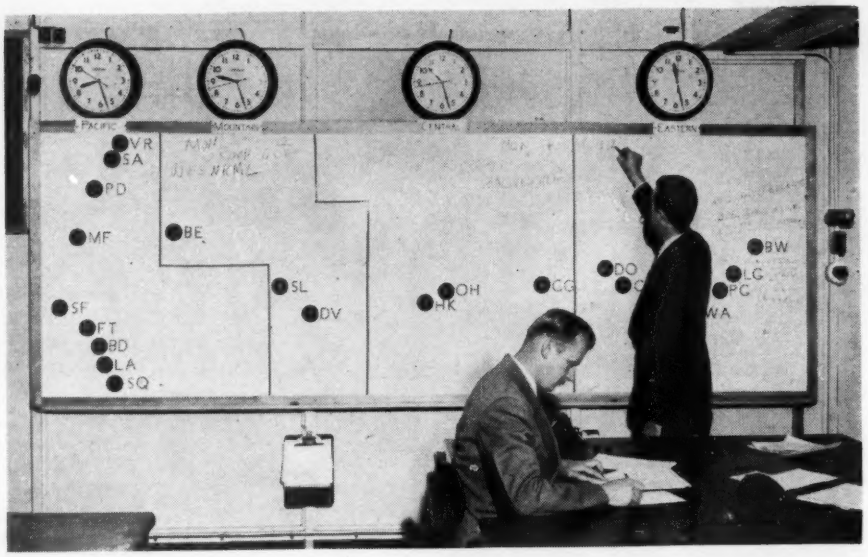
▶ **Second ILS Approach**—The Shannon crash occurred when the craft was making its second approach to the field. It had made one practice instrument pass. The plane came down approximately 1800 ft. from the end of the runway and immediately burst into flame. Thirty persons were killed.

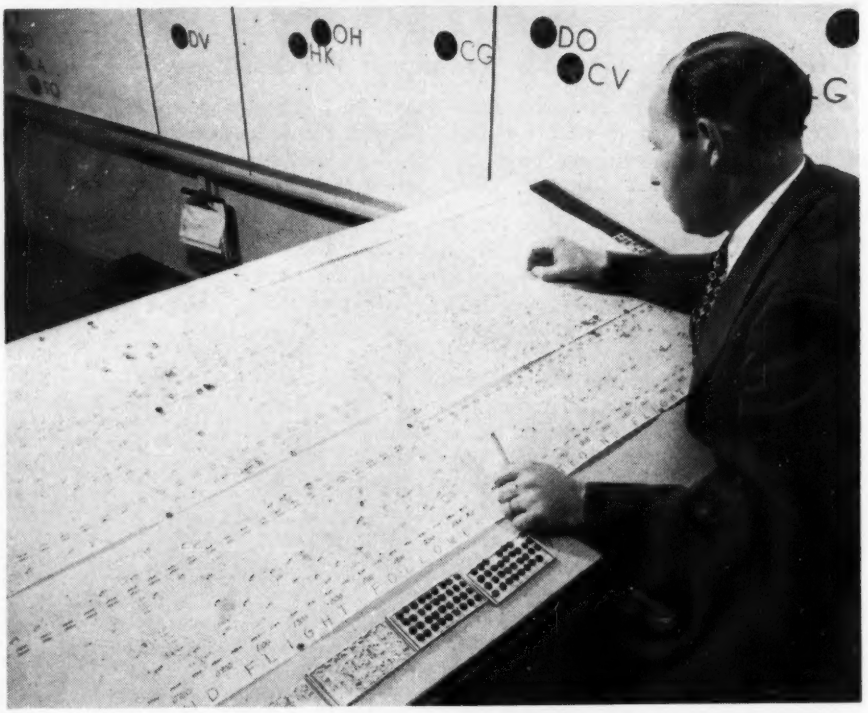
The question of who was flying at the time of the crash arose. Andrew J. Ball, a Pan American flight navigator, testified that the London dispatcher of the flight had said that Captain Jakel and Mr. Henson had agreed before takeoff that Henson was to fly the London-Shannon leg. It was testified, however, that most plane captains prefer to make their own landings.

▶ **Survivor's Story**—Marc T. Worst, vice president and Burbank manager of Lockheed Aircraft Service and the only survivor of the crash, testified that when the plane came down, he thought it was a regular landing, but just a poor touchdown. He attributed the bumps at that time to a slight turbulence at Shannon.

Then, Worst, said, he could feel the underpart of the plane scraping, and he knew they had crash-landed. Flames came from the front of the craft and swirled towards the back. Worst started to crawl on his hands and knees to the rear of the plane, and fell through a hole.

The hole previously had been the baggage compartment which had been ripped away while the plane scraped for 500 ft. along the hilly terrain.




## United Combines Its Reservations System

**Two of the key stations in United Air Lines' new passenger reservations headquarters at Denver are the map which charts possible weather interruptions (top) and the trip-follower board (below). Above the map are clocks showing time in the four zones across the country. At the board, the progress of east-bound flights are being charted. United's eastern and western regions have been combined for reservations purposes in the one center at Denver which is linked by telephone and teletype to the line's 60 reservations centers and 75 offices. The "speed reservations system" can handle 6500 space requests within the total period of 24 hours.**

## Gewirtz To Practice Law in Washington

Stanley Gewirtz, executive assistant to former CAB Chairman James M. Landis and to present Board Chairman Joseph J. O'Connell, Jr., has resigned effective June 15 to enter private law practice in Washington. He will be succeeded by Paul W. Cherington, who since January, 1947, has been CAB liaison representative to the Air Coordinating Committee and coordinator of special investigations for the Board.

Other personnel developments:

▶ **Aeronautical Radio, Inc.**—R. O. Smith, formerly vice president, has been appointed president to succeed Delos W. Rentzel, who was recently named CAA administrator.

▶ **Air Transport Association**—William T. Raymond has been named director of ATA's government affairs section succeeding J. J. Wadsworth, who resigned.

▶ **American**—H. K. Rullson, former AA treasurer, has been elected treasurer and a director of Flight Safety Foundation, Inc., New York.

▶ **Civil Air Transport (China)** — H. L. Richardson, director of research and development, is now in CAT's Washington office in the Washington Hotel.

▶ **Empire** — George Cooke has been appointed superintendent of operations replacing D. G. Hendrickson, who resigned.

▶ **KLM**—Hendrik K. De Graaf has become regional operations manager of the North American Division.

▶ **Monarch**—Harold Hale has been named assistant traffic and sales manager.

▶ **Northwest**—M. B. Cahill has been appointed to the newly created post of engineering pilot. His responsibilities cover type and production acceptance tests of new aircraft including the Martin 2-0-2 and Boeing Stratocruiser.

▶ **TWA**—Edward T. Bolton has become manager of European operations succeeding John E. Harlin, who has been named superintendent of international flying at TWA's New Castle, Del., base. . . . Dale Armstrong has resigned as vice president in charge of public relations.

▶ **United**—Karl Hughes has been appointed director of the foreign, tour and agency department with headquarters in Chicago.

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**Acme**—16; **Adams Studio**—9; **Tom W. Collins**—35; **Day Photographs**—32 (left and center); **NACA**—17; **U. S. Navy**—13; **Piaget**—32 (right); **Press Assn.**—10.

## SHORTLINES

▶ **Alaska Airlines**—Plans to inaugurate all-expense tours from all parts of the U. S. to Alaska on May 28, with flights continuing through Sept. 15. The 14-day trips will be made in 50-passenger DC-4s and will cover 7500 miles.

▶ **American**—Has completely activated its new $3,000,000 hangar at Chicago Municipal Airport. Structure is 620 ft. long and 240 ft. deep and provides over two acres of space for garaging and maintaining AA's planes. It consists of two bays, each affording a clear span of 275 ft. and a depth of 175 ft. Eight Convair-Liners or six DC-6s and two Convairs can be serviced simultaneously in each bay.

▶ **Braniff** — Carrier's first scheduled flight to Latin America via the Houston Gateway will leave Chicago June 4.

▶ **British Caribbean Airways**—A CAB examiner has recommended the company for a foreign air carrier permit authorizing service between Kingston, Jamaica, and Miami.

▶ **Chicago & Southern**—CAB has set $1.25 a plane mile as the temporary mail rate for Houston-Caracas, Venezuela, service via New Orleans and Havana. Present rate on the activated New Orleans-Havana segment is 95 cents a plane mile.

▶ **Continental**—Over 50 pilots based in Denver, Tulsa and El Paso are rotating in small groups through American Airlines' training center at Ardmore, Okla., for flight training on Convair-Liners. Supervisory personnel at Continental's maintenance and overhaul base at Denver have also been assigned to Ardmore. Carrier expects to take delivery on Convair-Liners beginning May 31.

▶ **Florida Airways**—Set new traffic records in April, carrying 1737 revenue passengers against 923 during the best 30-day period previously. Revenue passenger miles for April was 215,322.

▶ **Mid-Continent**—Directors have voted the company's first dividend—25 cents a share payable June 10 to stockholders of record May 20.

▶ **Slick**—Reports operating loss of $64,611 and net loss of $64,775 in January and operating loss of $23,092 and net loss of $23,241 in February. Revenue ton miles totaled 1,721,476 and 1,768,562, respectively. Company's overall deficit through Feb. 29 was $1,393,750. During February, operating revenues equalled 16.38 cents a ton mile and operating expense 17.69 cents a ton mile. Daily plane utilization in February was seven hours and load factor was 81.2 percent.

## CAB SCHEDULE

**May 24**—Hearing on Board's investigation of North Atlantic passenger fares. (Docket 3284.)

**May 24**—Prehearing conference on control of Parks Air Lines. (Docket 1670.)

**May 26**—Hearing on suspension of All American Aviation's pickup route certificate. (Dockets 2918 and 3293.)

**June 1**—Oral argument in freight forwarder case. (Docket 681, et al.)

**June 4**—Prehearing conference on feeder aspects of reopened Mississippi Valley Area case. (Docket 548, et al.)

**June 17**—Oral argument on reopened portion of Mississippi Valley Area case dealing with selection of carrier on Kansas City-St. Louis route. (Docket 548, et al.)

**June 23**—Hearing on Board's investigation of Pan American Airways' Miami-St. Thomas tariffs. (Docket 3274.)


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**5**

**TWIN ENGINE BEECH AIRCRAFT**

PURCHASED NEW 1946—ORIGINAL COST OVER $73,000 APIECE—TOTAL TIME SINCE NEW LESS THAN 365 HOURS

FS-4970, Aviation Week
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LIGHT-WEIGHT, HIGH-STRENGTH SANDWICH STRUCTURES
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**McDonnell Aircraft Corporation**

**Lambert—St. Louis Municipal Airport**

**Box 516, St. Louis (3) Missouri**

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**Salary commensurate with experience.**

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Who can fit into established flight test organization. Flying will not involve aircraft prototype testing. Engineering background absolutely necessary. Formal engineering training desireable. State qualifications, first letter, including instrument flying experience, single and multi-engine time and engineering experience.

P-4973, Aviation Week
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AIRLINE PERSONNEL Wanted. Air Division Naviera Colombiana operating PBM-5's in Colombia, South America. Need following personnel: Pilots, Co-pilots, Flight Engineers, Engine Mechanics, Stock Room Men, Radio Technicians, Electricians. Submit aviation experience in complete detail, giving positions held, dates, rates of pay, aviation schools attended, licenses held, family status, age, physical condition, date of availability. P-4968, Aviation Week.

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AIRCRAFT MAINTENANCE Engineer. Design Engineering and administration graduate. 2½ yrs. ground and in-flight maintenance experience. CAA license. Desire aeronautical connection in East. Opportunity for advancement now more important, than starting salary. Available June 30. PW-4928, Aviation Week.

ELECTRONIC ENGINEER, age 32, BS-EE, ten years experience administration and maintenance engineering in communications and electronics with prominent airline; now chief engineer for small manufacturer of aviation radio equipment but desires greater opportunity. Presently located in Florida. Excellent references. PW-4953, Aviation Week.

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G-21-A, for sale, completely major overhauled, new fabric, licensed eight passengers, January 1948. E. R. Tucker, Waynesboro, Penna.

**Priced for Immediate Sale**

Grumman G-21 Goose. Zero hours since complete major on entire aircraft, engines, accessories. Never operated commercially or in salt water. Amphibian Air Transport, Inc., Long Beach Municipal Airport, Long Beach, California.

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3000 new replacement packs for 24 foot Army-Navy standard seat type parachutes. Complete with cones, frame and pack-opening elastics. Available for export. For further details contact, Security Parachute Co., Oakland Airport, Oakland, Calif.

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Cargo or Passenger. 21 removable seats. Just relicensed. P & W 1830-92 Engines. Arthur C. Hyde, Congressional Airport (N.W. Washington, D. C.) Clinton, Md. Telephone Oliver 8888.

**Two Curtiss C-46 Commando**

Aircraft. Both ships manufactured February 1945, total time 662 and 668 hours since new, both fully equipped. Never were painted or out of the country. Cargo floors and bucket seats never used. Both have had 100 hour inspection and long range tanks installed. Can be exported. $35,000, each or $63,000 for both. Steve Richards, Box 725, Burlington, Vt.

**Available three North American Navions,** test time only, complete including G.E. Receiver-Transmitter, and instrument flying panel. Offers considered. FS-4958, Aviation Week.

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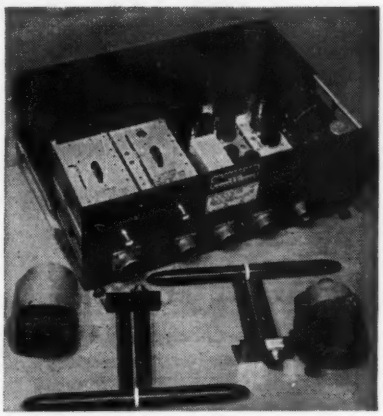

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21 SEATS LUXURIOUS INTERIOR
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All low frame and engine time, in first class condition. For complete specifications and prices—

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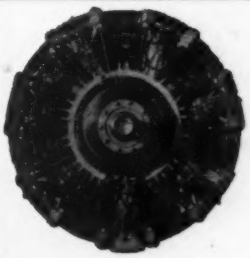

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***Not a converted C-47***

**Total time 3800 hours Engines 1830-92 zero time since major. Dual ADF—VHF Collins. The interior of this aircraft was designed for an executive of major oil company and can be used as a twenty-one passenger or executive transport. Interior includes upholstered hat racks, cold air ducts, individual seat lights, complete enclosed buffet, baggage compartment and door in rear. 24 volt system. Currently licensed April 1947.**

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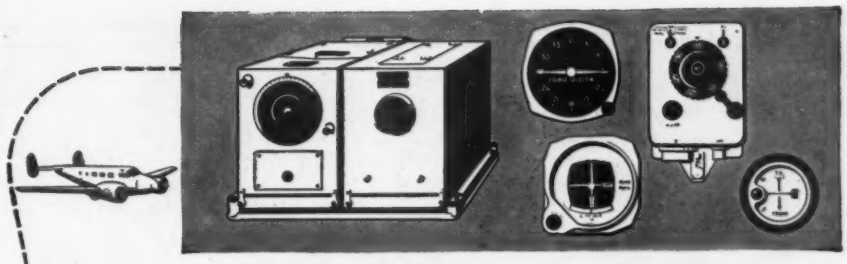

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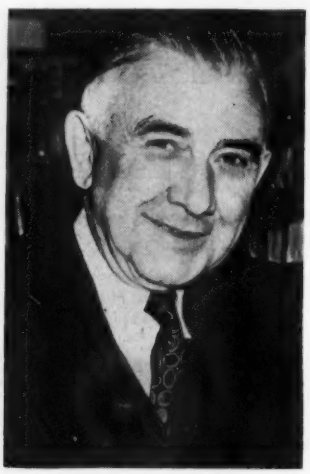
# Reply to a Politician's Smear

The Civil Aeronautics Board's official report on the crash of an American Airlines research DC-3, named the Alpha, ends a series of vicious and uninformed charges by a politician. It clears a flight crew of sensational but baseless accusations of drunkenness.

The plane fell into Bowery Bay, Aug. 8, 1947, adjoining LaGuardia Airport, while attempting a single-engine landing. Three men died. Two others survived. As reported last week, an engine failure was due to a fractured oil screen cover plate gasket.

Alcohol was found in the organs of the three men by the city toxicologist. He listed "3-plus-alcohol" after the name of the pilot, Capt. William A. Davidson. Later, a witness from the Yale Laboratory of Applied Physiology testified

Capt. Davidson



Politician Sullivan

that the pilot could not even have walked aboard the plane unassisted, in that state of drunkenness.

Nevertheless, apparently prodded by a Long Island newspaper which has displayed an anti-aviation attitude before, District Attorney Charles P. Sullivan issued an announcement, used by all metropolitan newspapers and the wire services. He disclosed the alcohol findings, gave the public no room for doubt that the crew had been drinking, and set out to determine if there had been negligence in permitting Davidson to start his flight.

Meanwhile, American's President Ralph Damon issued a strong denial of the charges, and five company officials gave similar testimony. Police were asked by Sullivan to canvass all nearby grills and bars, but found no evidence.

Then a Queens County Grand Jury heard testimony. The circumstantial evidence remained the sole basis for Sullivan's accusations. Dr. Howard W. Haggard, the Yale specialist, was present at the Queens County Court House but the jury did not call him. American filed affidavits of 28 officials who worked or talked with Captain Davidson in the seven hours before the takeoff. Only three were allowed to testify. All said he was sober.

Nevertheless, since the liquid was grain alcohol instead of isopropyl alcohol, which the airline said it was then using, all of this testimony was ignored and the Grand Jury decided the pilot "was in a state of intoxication."

Then in another public statement Sullivan praised the jury for "protecting the lives of Queens residents against drunken pilots." He urged that every pilot be tested for alcoholism before each flight. This new pronouncement, of course, received more prominent attention in the New York press and probably hundreds of thousands of readers of another batch of newspaper editions again associated airline pilots and drunkenness. President Damon in a formal statement attacked the jury's presentment as an arbitrary action in disregard of the known facts and available evidence.

"The reputations of the deceased crew members and of the airline have been jeopardized," Mr. Damon said. "They failed to call Dr. Howard W. Haggard, world renowned medical expert and director of the Yale Laboratory of Applied Physiology. He was prepared to show there was insufficient evidence of Davidson's intoxication and that the presence of alcohol was probably due to the peculiar circumstances of the crash.

"The autopsy performed on Davidson after the crash by the Queens County Medical officer was incomplete and inconclusive and not in accordance with accepted standards. This finding simply repeats the published statements of the district attorney of Queens before the hearing."

The jury's opinion had said the alcohol discovered "cannot be accounted for in any other way than that the said pilot and copilot had drunk some intoxicating agent before the crash . . ." This, of course, was a vicious lie.

The Navy conducted salvage Aug. 10. Both cockpit seats and the bulkhead behind had been forced aft about three feet by impact, according to the official CAB report.

"After the conclusion of the first hearing in this case evidence was presented in the form of a toxicologist's report following an incomplete autopsy by Queens County, N. Y., medical officials to the effect that three-plus ethyl alcohol content was found in Captain Davidson's liver; one-plus ethyl alcohol was in First Officer (Walter) Zundel's brain; and one-plus ethyl alcohol was in the liver of Henry Hickey, one of the mechanics aboard the aircraft," said CAB.

"Alpha was equipped with alcohol deicer tanks with a total capacity of 20 gallons, and it was normal practice to keep these tanks full. The 4-gallon propeller deicing tank located behind the first pilot seat was punctured in the accident, and it contained no deicer fluid when removed from the aircraft after salvage. The 6-gallon windshield deicer tank located approximately two feet aft of the bulkhead immediately behind the second pilot seat was also punctured, and the attaching lines were torn loose.

"The aircraft was manufactured for the Army at Long Beach, Calif., Feb. 15, 1944, and records indicate that it was outside the continental limits of the U. S. from March 11, 1944, until after Sept. 20, 1945. The aircraft was purchased . . . from the U. S. government Dec. 7, 1945, and during the course of the next two months it was modified for experimental use. During this modification the alcohol system was not changed nor were the alcohol tanks drained.

"A month and a half prior to the date of manufacture of the aircraft, an Army technical order was issued calling for the use of isopropyl alcohol instead of ethyl alcohol as a deicing agent. In March 1945, isopropyl, the type of deicing agent also desired to be used by the company became available, and the engineering department issued a materiel specification calling for its use. An amendment was issued to this specification in October 1945, due to the fact that the type of deicing agent previously used and containing ethyl alcohol was still found to be on hand. The amendment stated that this deicing fluid should be used prior to the replenishment of deicing systems with isopropyl.

"Since ethyl alcohol may have been carried as a deicing agent in the aircraft, and since ethyl alcohol found in the bodies of the two pilots and the mechanic during the autopsy may have been the result of involuntary intake when they were drowned in the aircraft, no conclusion as to intoxication can be based upon the evidence of the toxicologist's report.

"All other evidence concerning the habits and behavior of the two pilots and the mechanic was to the effect that they reported for duty in a normal and sober condition, and that no use was made of intoxicating liquors any time during the day of this flight. It is, therefore, concluded that they were not under the effect of intoxicating liquors."

So a politician seeking re-election refuses to listen to technical and professional authorities before he smears the reputation of three men and a company, and creates in the minds of laymen an unjustified suspicion that airline pilots not only drink on duty, but that such men are defended.

Although the facts from two CAB investigations—which heard 41 witnesses—can never catch up with all of the newspaper readers who saw the original and repeated accusations, we devote this page to the facts, nevertheless.

We print the picture of Captain Davidson as an honor. We publish the likeness of the politician for another reason—we thought you would be curious to know, as we were, what a man like this looks like.—**ROBERT H. WOOD**

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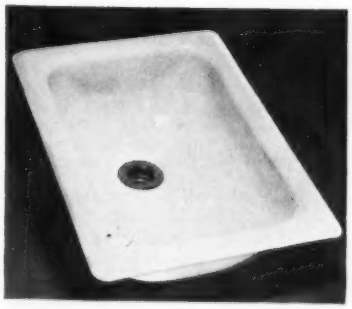

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